

IRG Systems South Asia Pvt. Ltd.



IRG Systems South Asia Pvt. Ltd.



”Mission ...

To help governments, the private sector, communities and households manage critical resources to build a cleaner, safer and more prosperous world.”

IRGSSA designs, implements, and manages programs in various sectors including:

Solid Waste Management

E-Waste Management

Geoinformatics

Disaster Management

**Environment
&
Natural Resources**

Energy

**Environmental
Management**

Energy Efficiency

**Water Resources
Management**

Solid Waste Management

IRG Systems South Asia (P) Ltd. (IRGSSA) is a New Delhi, India based subsidiary of International Resources Group (IRG), an L3 Company, USA. The firm is registered in India as a management-consulting firm, providing worldwide management consulting services in environment, energy, natural resources, and disaster management. The firm provides international quality service to clients specifically providing customized solutions to client's needs. These clients include national and provincial governments, private corporate houses, multi and bilateral donor agencies like UN, The World Bank, The Asian Development Bank, USAID, multinational companies, NGOs and industries.

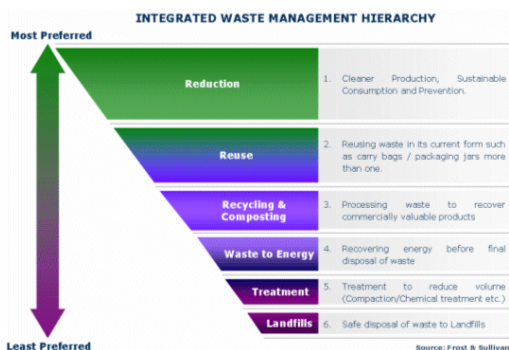


Waste Management addresses broad-ranging issues, which we have grouped under Hazardous Waste Management and Municipal Solid Waste Management. IRGSSA assists clients in addressing the regulatory requirements, proper identification, collection, storage, processing, treatment and disposal of these materials.

We are leading consultants in the area of Municipal Solid Waste Management (MSW). We have carried out studies in the area of MSW generation, physical and chemical characterization, EIA of sanitary landfill sites, their design and engineering.

IRGSSA has completed a detailed survey of Municipal Solid Waste Collection, Characterization and Transportation for areas of Municipal Corporation of Delhi (MCD), New Delhi Municipal Corporation (NDMC) and Delhi Cantonment Board as awarded by IL&FS Ecosmart Ltd.

IRGSSA has completed Environmental Impact Assessment of Narela – Bawana in Delhi. The other EIA of landfill sites includes Okhla and Gazipur Landfill sites awarded by Municipal Corporation of Delhi. IRGSSA is also executing diversified projects related to solid waste and hazardous waste management, so with our prior expertise we offer an extensive capability and track record in waste management and impact assessment studies in India.



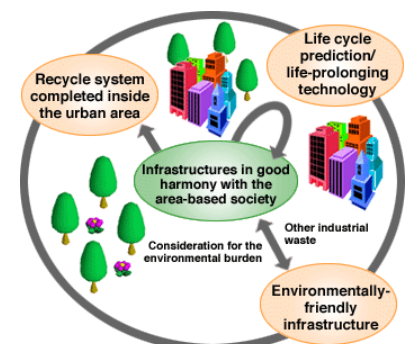
IRGSSA has undertaken EIA Study including DPR Preparation and Environmental Management Plan for Proposed Landfill Site for Municipal Solid Waste Management in Panchkula Urban Complex comprising Panchkula, Pinjore and Kalka on behalf of HUDA. The EIA study is aimed at integrating environmental considerations into the overall project planning and development viz. the construction, operation and maintenance of the secured landfill facility.

The main objectives of the study are:

- To identify and assess the environmental impacts associated with the implementation of SLF, on the physical, biological and socio- economic environment
- To prepare a management plan to incorporate such activities in the implementation plan, that would mitigate adverse potential impacts on the environment
- To ensure implementation of SLF project in compliance with the various requirements of the relevant environmental legislations
- To enable HUDA to obtain environmental clearance for the SLF project.

IRGSSA has carried out the following tasks.

- Review of Regulatory Requirements pertaining to EIA Study
- Delineation of the study area
- Compilation of baseline data on the physical, biological and socio-economic environment followed by their analysis and interpretation.
- Prediction of environmental impacts.
- Evaluation of impacts.
- Preparation of Environmental Management Plan.



IRGSSA is carrying out the above tasks using remote sensing techniques involving preparation of base map through LISS III satellite imagery. Extensive water quality testing including microbial testing in seven km of study area around SLF. Air quality, noise quality modelling and ground water predictive modelling using scientific software ex. Landgem, Mike series, ISCT III etc. Further, Environmental monitoring and management plan are being formulated to be institutionalised at HUDA and private operators.



IRGSSA has recommended feasible mitigating measures to offset / minimize the potential negative impacts. These measures include generic measures during construction and operation of the project. Provision of leachate treatment system and green belt has been recommended. A conceptual final cover system for SLF has also been recommended. A comprehensive environmental monitoring plan during construction, operation and post closure has been recommended along with budgetary estimates. Finally institutional mechanism to implement EMP has been developed for implementation.

IRGSSA has undertaken Environmental Impact Assessment of Solid Waste Treatment & Disposal Sites in Bhubaneswar and Puri. On behalf of the Housing and Urban Development Department, Government of Orissa, OREDA has proposed to install a Refuse Derived Fuel (RDF) based power project using the Municipal Solid Waste (MSW) generated in the twin cities of Cuttack and Bhubaneswar through Public / Private Participation. The solid waste of both cities amounts to approximately 500 MT, and would be brought to a place called Bhuasuni in Bhubaneswar block area which is at a distance of 12 K.M. from Bhubaneswar and 18 K.M. from Cuttack. The RDF based Power Project as well as the land fill site will be located in Bhuasuni.

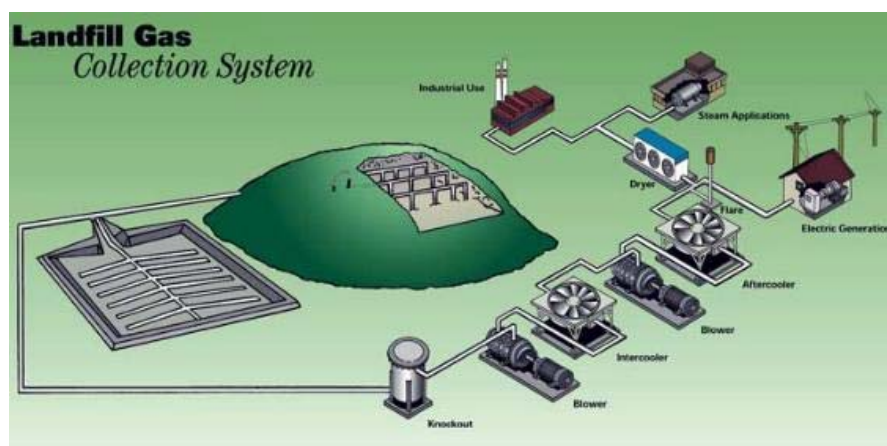
Similarly in Puri, a functional mechanized composting plant already exists. But there is no space for disposal of the rejects of the composting plant. The District Administration and Municipal Authorities have located a site at a distance of about 10 KM from Puri for creating a land fill facility.



In view of the stipulations of JnNURM as well as those laid under Municipal Solid Waste Management and Handling Rules – 2000 and relevant CPCB guidelines it is mandatory to have Environmental Impact Assessment Studies done of both the sites before taking up execution of the projects.

The objective of this study as per the proposal is “Environmental Impact Assessment (EIA) study (limited to the technical aspects) for the proposed Landfill sites at Bhuasuni in Bhubaneswar and Gorual in Puri.

IRGSSA has also assisted the project proponents in securing the Environment Clearances / Consent to Establish / Operate and No Objection Certificates from competent authorities for the concerned projects from the Expert Appraisal Committee, Union Ministry of Environment and Forests; State Expert Appraisal Committees, Pollution Control Committees / Councils and Forest & Wildlife Departments.



IRGSSA's SWM Project Profile in India

Detailed Survey of Municipal Solid Waste Collection, Characterization and Transportation for Municipal Corporation of Delhi



The project included an assessment of solid waste management in NCT of Delhi. The study includes zone wise quantification, degree of segregation & method of collection & transportation of mixed waste and specific waste. The study also includes assessment of existing mechanism of waste transportation; characterization of municipal waste; quantity estimates and physical and chemical characteristics of sample waste collected from dhalaos and landfill. The objective of the project is to assess the generation and characteristics of solid waste for developing a PPP project for waste treatment.

IRGSSA carried out a detailed survey of 800 dhalaos in NCT of Delhi falling under twelve zones of Municipal Corporation of Delhi, New Delhi Municipal Corporation and Delhi Cantonment Board. Sampling was carried out for a week so as to test the physical and chemical characteristics of waste at 138 selected dhalaos and 10 sampling points at Landfills. Data collected from sampled dhalaos was subjected to different statistical modules so as to assess the total waste being generated and its physical and chemical characteristics. Further, GIS based routing maps was generated so as to access the operational expenses with and without the proposed treatment facilities. This analysis was based on origin and destination survey carried out at workshop as well as landfill site, landfill-tipping data etc. Finally, option analysis for disposal of MSW was carried out based on physical and chemical characteristics, availability of MSW and feasibility of option. This analysis will be used by the client to develop the project.



Consultancy for Private Public Partnership Project of the MCD for Collection & Transportation of MSW in Selected MCD Zones.



MCD as part of its public private partnership (PPP) in the area of Solid Waste Management has opted for privatization of ten zones to achieve efficiency in MSW service delivery. The objective of the project is to increase efficiency and effectiveness of waste management activities, within the provisions of the Municipal Solid Waste (Management and Handling Rules, 2000) by adopting the following:

- Defining an effective, efficient and holistic plan for the entire process of Municipal Solid Waste (MSW) collection and transportation, of waste in a segregated manner, for disposal at the locations to be specified by MCD.
- Optimizing usage of all the resources and minimizing costs.
- Overall monitoring and coordination.
- Operation and Maintenance of all the project facilities for the specified period of 9 years.
- Using communication technology as a decision making tool.
- Spreading awareness regarding segregation of waste (i.e. biodegradable, non biodegradable, recyclable and hazardous waste), the health & environmental impacts of the waste & reuse, recycle and recovery of materials.
- Facilitating community participation in Solid Waste Management (SWM) activities.



In this context IRGSSA was assigned the task to prepare bid document for M/s Sancheti Ltd. for all the four zones in the second round of bidding.

IRGSSA carried out survey of all Dhalaos in the four zones (Shahdra North, Shahdra South, Civil Lines, Najafgarh and Dwarka) and assessed their existing conditions with respect to their capacity and quantity of

municipal solid waste. IRGSSA estimated municipal solid waste arriving at each dhalao from households and assessed the quantum of waste transported and disposed on landfill sites. IRGSSA also surveyed the transportation routes and assessed the infrastructure needs including refurbishment, capacity augmentation, number of bins and requirement of new machinery like compactors for transportation of MSW. Based on quantitative estimated IRGSSA developed financial model consisting of capital costs, operating costs and tipping fee for the operator during the concession period.

TA for Private Public Partnership Project of various Urban Local Bodies for Collection & Transportation of MSW in their respective Zones in the state of Uttar Pradesh.

RCUES as part of its public private partnership (PPP) in the area of Solid Waste Management has opted for privatization of various zones in the state of UP to achieve efficiency in MSW service delivery. The objective of the project is to increase efficiency and effectiveness of waste management activities, within the provisions of the Municipal Solid Waste (Management and Handling Rules, 2000) by adopting the following:



- Defining an effective, efficient and holistic plan for the entire process of Municipal Solid Waste (MSW) collection and transportation, of waste in a segregated manner, for disposal at the locations to be specified by RCUES.
- Optimizing usage of all the resources and minimizing costs.
- Overall monitoring and coordination.
- Operation and Maintenance of all the project facilities for the specified period of 9 years.
- Using communication technology as a decision making tool.
- Spreading awareness regarding segregation of waste (i.e. biodegradable, non biodegradable, recyclable and hazardous waste), the health & environmental impacts of the waste & reuse, recycle and recovery of materials.
- Facilitating community participation in Solid Waste Management (SWM) activities.

In this context IRGSSA is providing Technical Assistance to M/s. Ion Exchange Infrastructure Ltd.

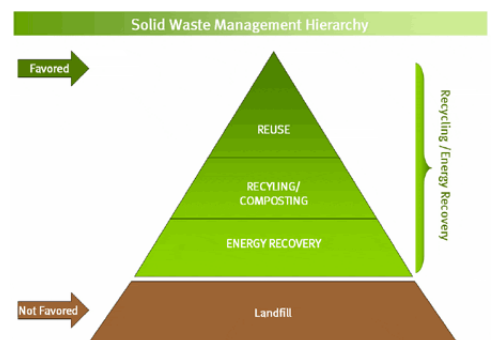


IRGSSA carried out survey of all Dhalaos in the zones and assess their existing conditions with respect to their capacity and quantity of municipal solid waste. IRGSSA would estimate municipal solid waste arriving at each dhalao from households and assess the quantum of waste transported and disposed on landfill sites. IRGSSA will also survey the transportation routes and assess the infrastructure needs including refurbishment, capacity augmentation, number of bins and requirement of new machinery like compactors for transportation of MSW. Based on quantitative estimate IRGSSA will develop financial model consisting of capital costs, operating costs and tipping fee for the operator during the concession period.

Study of Issues and Opportunities in Municipal Solid Waste Management in India

The study entailed the following specific tasks:

- Review of existing regulatory requirements
- Review of the existing Institutions and Institutional framework for SWM
- Overview of process of Solid Waste Generation:
- Assessment of Solid Waste Generation
- Review of current lending in SWM
- Cost Implications of SWM



IRGSSA carried out assessment of existing model of SWM in India. This included overview of the existing SWM in India, and case studies of model municipalities in different states in India. IRGSSA carried out technology assessment with respect to different types of solid waste management in different cities in India. The technology assessment included assessment of different options including waste to energy, composting and sanitary landfill disposal. Further, financial assessment of the municipalities was carried out in terms of recovery of cost of services i.e. cost for collection, transportation and disposal of MSW. This also included assessment of risk bearing capacity of the municipalities with respect to new investment i.e. either loan or

equity for SWM. A financial model was developed to assess the suitable tariff structure of SWM for the municipality.

EIA Study including DPR Preparation and Environmental Management Plan for Proposed Integrated Landfill Site for Municipal Solid Waste Management in Panchkula Urban Complex comprising of Panchkula, Pinjore and Kalka

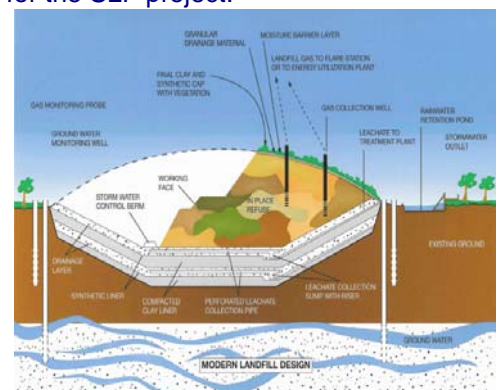
The EIA study was aimed at integrating environmental considerations into the overall project planning and development viz. the construction, operation and maintenance of the secured landfill facility.

The main objectives of the study were:

- To identify and assess the environmental impacts associated with the implementation of SLF, on the physical, biological and socio- economic environment
- To prepare a management plan to incorporate such activities in the implementation plan, that would mitigate adverse potential impacts on the environment
- To ensure implementation of SLF project in compliance with the various requirements of the relevant environmental legislations
- To enable HUDA to obtain environmental clearance (if required) for the SLF project.

IRGSSA has carried out the following tasks.

- Review of Regulatory Requirements pertaining to EIA Study
- Delineation of the study area
- Compilation of baseline data on the physical, biological and socio-economic environment followed by their analysis and interpretation.
- Prediction of environmental impacts.
- Evaluation of impacts.
- Preparation of Environmental Management Plan.

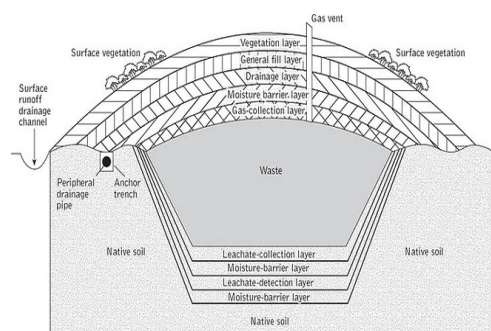


IRGSSA has carried out the above tasks using remote sensing techniques involving preparation of base map through LISS III satellite imagery. Extensive water quality testing including microbial testing in seven km of study area around SLF. Air quality, noise quality modelling and ground water predictive modelling using scientific software ex. Landgem, Mike series, ISCT III etc. Further, Environmental monitoring and management plan were formulated to be institutionalised at HUDA and private operators.

The EIA report has brought out following conclusions:

- All the natural water bodies/ natural wetlands are excluded from direct action by the project.
- The project involves minor changes to the existing conditions of the land use or natural vegetation patterns.
- The bulk of proposed interventions will contain no impact on endangered species of flora and fauna.
- No major community utilities are falling in the direct impact zone of project.
- No rehabilitation and resettlement component is falling in the direct impact zone of the project.

Feasible mitigating measures to offset/minimize the potential negative impacts have been recommended. These measures include generic measures during construction and operation of the project. Provision of leachate treatment system and green belt has been recommended. A conceptual final cover system for SLF has also been recommended. A comprehensive environmental monitoring plan during construction, operation and post closure has been recommended along with budgetary estimates. Finally institutional mechanism to implement EMP has been developed for implementation.

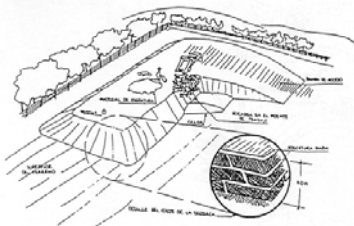


Environmental Impact Assessment of Solid Waste Treatment & Disposal Sites in Bhubaneswar and Puri

On behalf of the Housing and Urban Development Department, Government of Orissa, OREDA has proposed to install a Refuse Derived Fuel (RDF) based power project using the Municipal Solid Waste (MSW) generated in the twin cities of Cuttack and Bhubaneswar through Public / Private Participation. The solid waste of both cities amounts to approximately 500 MT, and would be brought to a place called Tulsadeipur in Bhubaneswar block area which is at a distance of 12 K.M. from Bhubaneswar and 18 K.M. from Cuttack. The RDF based Power Project as well as the land fill site will be located in Tulsadeipur.

Similarly in Puri, a functional mechanized composting plant already exists. But there is no space for disposal of the rejects of the composting plant. The District Administration and Municipal Authorities have located a site at a distance of about 10 KM from Puri for creating a land fill facility.

In view of the stipulations of JnNURM as well as those laid under Municipal Solid Waste Management and Handling Rules – 2000 and relevant CPCB guidelines it is mandatory to have Environmental Impact Assessment Studies done of both the sites before taking up execution of the projects.



The objective of this study as per the proposal is "Environmental Impact Assessment (EIA) study (limited to the technical aspects) for the proposed Landfill sites at Tulsadeipur in Bhubaneswar and Gorual in Puri.

IRGSSA would be conducting a comprehensive EIA, and subsequently feasible mitigation measures to offset / minimize the potential negative impacts will be recommended.

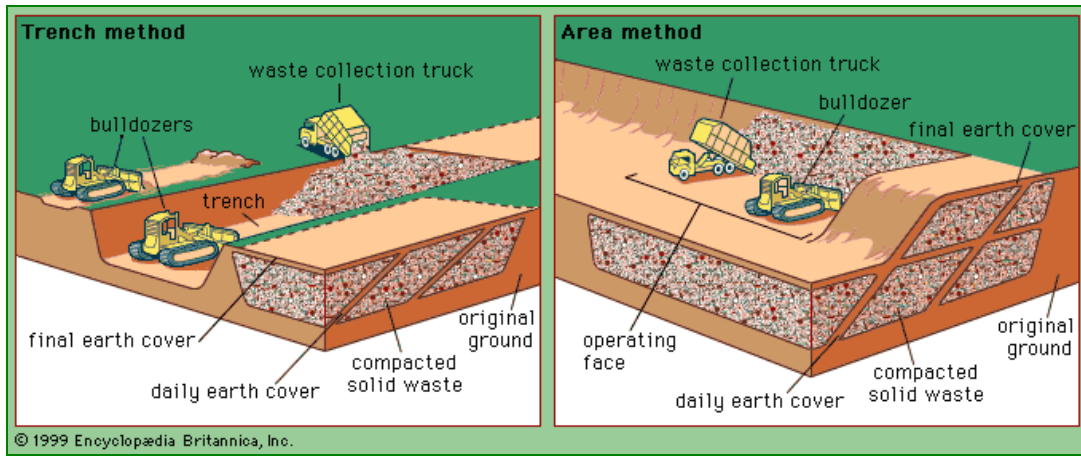
Our understanding of the scope of work to achieve the objective; is envisaged as follows:

- To visit the proposed site, in order to assess whether the site confirms to the preliminary location criteria for site identification.
- To collect the baseline information on the quantity of waste generation, type of waste.
- To estimate the land area required for the disposal of the solid waste generated for 30 years.
- To collect the information in and around the proposed sites with regards to technical aspects such as Air, Surface Water, under ground water, Soil, Geology, Hydrogeology and Meteorology.
- To develop surface drainage pattern of the site area at regional and local level in order to ascertain the surface drainage run-off direction as well as magnitude
- To develop the Land Use & Land Cover Mapping based on Remote Sensing
- To carry out the Soil Investigation of the proposed site area.
- To carry out the ambient air quality monitoring in order to ascertain the background contamination level.
- To carry out the ground water quality monitoring in order to ascertain the background contamination level.
- To assess potential impacts on all components of environment resulting from the construction & operation of a Municipal Landfill Facility.
- To carry out Risk Analysis and suggest abatement methods for adverse environmental impacts likely to occur during the operation of Municipal landfill facility.
- To help the respective municipal authorities in technical discussions with respect to EIA study and design of landfill with the Orissa Pollution Control Board (OPCB).
- To prepare a conceptual design of the proposed landfill facility required to be submitted to OPCB along with the EIA report.



EIA Study for Proposed Landfill site at Narela - Bawana Road, Delhi and Monitoring Study for Existing Landfill Sites at Okhla Phase – I and Gazipur, Delhi

The EIA study is aimed at integrating environmental considerations into the overall project planning and development viz. the construction, operation and maintenance of the secured landfill facility.



The main objectives of the study are:

- To identify and assess the environmental impacts associated with the implementation of SLF, on the physical, biological and socio- economic environment
- To prepare a management plan to incorporate such activities in the implementation plan, that would mitigate adverse potential impacts on the environment
- To ensure implementation of SLF project in compliance with the various requirements of the relevant environmental legislations
- To enable MCD to obtain environmental clearance (if required) for the SLF project.

IRGSSA is carrying out the following tasks.

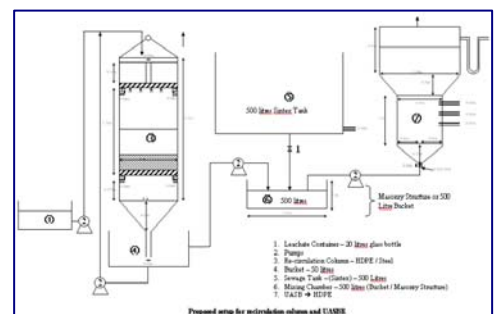
- Review of Regulatory Requirements pertaining to EIA Study
- Delineation of the study area
- Compilation of baseline data on the physical, biological and socio-economic environment followed by their analysis and interpretation.
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IRGSSA has carried out the above tasks using remote sensing techniques involving preparation of base map through LISS III satellite imagery. Extensive water quality testing including microbial testing in seven km of study area around SLF. Air quality, noise quality modeling and ground water predictive modeling using scientific software ex. Landgem, Mike series, ISCT III etc. Further, Environmental monitoring and management plan has been formulated to be institutionalized at MCD and private operator.

Study of onsite treatment of the leachate using UASB reactor - Design and construction of the leachate re-circulation and treatment system at the Okhla landfill site

Integrated approach was used to study the onsite treatment of the leachate. It involved both, recycling and treatment of the re-circulated leachate using UASB reactor. Following were the specific scope of the work:

1. Design and construction of the leachate re-circulation and treatment system at the Okhla landfill site.
2. Single pass of the collected leachate through the re-circulation column.
3. Collection of the domestic sewage from Okhla STP so as to mix it with the leachate before treating using UASBR.
4. Treating the mixed leachate (leachate + domestic sewage) using UASBR.
5. Input to the analysis of raw and single pass leachate for the various parameters like COD, pH, alkalinity, TKN and heavy metals.



IRGSSA provided the detailed engineering design and commissioned a pilot project for leachate treatment using UASB technology at Okhla site. IRGSSA prepared conceptual design, detailed engineering design, BOQ and finally procured material and equipment. IRGSSA commissioned the plant for future studies to be carried out by R&D division of MCD.

Industrial Waste Management and Recycling in India



The attention on industrial waste management and recycling in Asian countries has increased in Japan, because Japanese manufacturers located in other Asian countries are starting efforts on recycling. In some surveys, Japanese manufacturers claimed that the information on industrial waste management and recycling are not enough in Asian countries.

In 2004, Ministry of Economy, Trade and Industry (METI) of Japan established the Working Group on Enhancing International Recycling in Industrial Structure Council, which made a report titled "Toward Sustainable Asia based on 3Rs". The report recommends that government should conduct information gathering and sharing on waste management and recycling in Asian countries.



Corresponding to this proposal, METI asks the Institute of Developing Economies, JETRO to conduct a research on policies for industrial waste management and recycling in Asian countries. The objective of this joint study is the information collection on policies and actors in the field of industrial waste management and recycling in Asian countries.

Japanese government also announced "Action Plan for a World-Wide Sound Material Cycle Society through the 3R Initiative" at the Ministerial Conference on 3Rs, which was held in Tokyo in April 2005. The action plan also contains cooperation with Asian countries for promoting zero-waste society. This joint research will be background information to conduct international cooperation from Japan to Asian countries.

IRGSSA conducted research, collected and compiled the report consisting of –

Policies for Industrial Waste Management and Recycling;

(1) National Law and Policy/Program on industrial waste management

(a) Government Policies and programs on industrial waste management and recycling

(b) Legal framework

- Legal framework of industrial wastes and recycling

- Classification of waste, hazardous wastes, toxic wastes and so forth, and recycling

- Specify web sites for the original text of laws and regulations, and the collection of reliable English translation if any (if they do not exist on web site, collect, translate and compile them as pdf. file.)

(c) Responsible government authorities

- Government authorities and departments (related ministries and agencies in Government)

- Local governments and departments at regional level

- Functions and duties

(d) Standards and testing methods to identify hazardous wastes

(e) Any campaigns, programs and policies to promote recycling

(f) Promoting organizations and the activities

- government related associations and councils

- other associations and so forth/NGO

(2) Regulatory system and measures

(a) Definition of parties related to wastes

- waste generator/collector/transporter/importer/exporter

- association of recycling sector, NGO/ driver/ recycler

- others

(b) Regulatory system and measures

- Minimization of wastes

- Licensing control / permit system (planning stage, building stage, and etc.)

- Registration for waste recycler, transporter and disposal site.

- Disclosure system (If name of companies are disclosed, identify the web-page or other sources.)

- Reporting

- Treatment and disposal site

- Sanctions

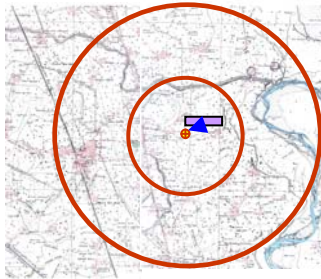
- Manifest System

- Others

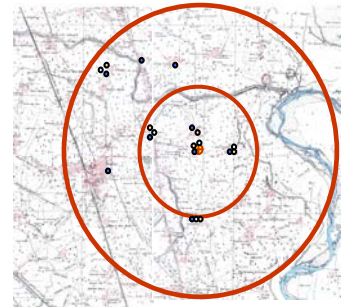
(c) Specific Issues

- Duties and Responsibilities of respective parties: industrial waste generator, collector, transporter, importer/exporter, driver, recycler, consumer and so forth
 - Responsibilities of waste generator if contractor on waste management dumped waste illegally, or caused pollution in the process of treating the waste
 - Responsibility of Manufacturer on waste (EPR; Extended Producer Responsibility)
 - Regulation on export and import of recyclable waste, hazardous waste and secondhand goods
- (d) Fees to treat and dispose industrial wastes
- (e) Monitoring and auditing
- (f) Dissemination of information of the treatment and disposal site
- (g) Other topics related to industrial waste management and recycling
- (3) Collection and compiling Data and Information on industrial waste management

EIA and Inventorization of Industrial Waste Disposal Landfill facility at Kundli, Haryana

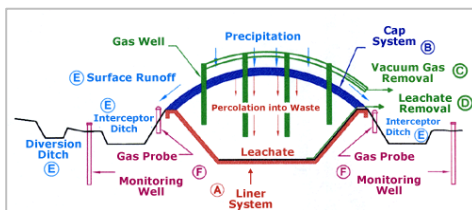


HSIDC is developing industrial waste disposal landfill facility at Kundli to facilitate industrial units of Kundli, Barhi, Murthal and Rai for disposal of their waste. In this regard, Environmental Impact Assessment (EIA) has been carried out to assess the likely impacts on environment within the influence zone of proposed facility.



The main objectives of the EIA study was to identify and assess the environmental impacts associated with the implementation of industrial land fill, on the physical, biological and socio- economic environment and to prepare a management plan to incorporate activities in the implementation plan, that would mitigate adverse impacts on the environment. The study has been carried out in an area falling under seven-kilometer radii from the center point of proposed landfill.

The study conforms to regulatory requirements under Hazardous Waste (management & handling) rules 2003, relevant CPCB guidelines and EIA notification 1994.



IRGSSA has completed the Inventorization and a comprehensive EIA, and subsequently feasible mitigation measures to offset / minimize the potential negative impacts have been recommended. These measures include generic measures during construction and operation of the project; provision of leachate treatment system is inbuilt in the proposed landfill design and green belting the surrounding site, avenue tree plantation along haulage route and solid noise barrier have been

recommended. A conceptual final cover system for landfill has also been recommended. A comprehensive environmental monitoring plan during construction, operation and post closure has been recommended along with budgetary estimates. Institutional mechanism to implement EMP has also been developed for implementation.

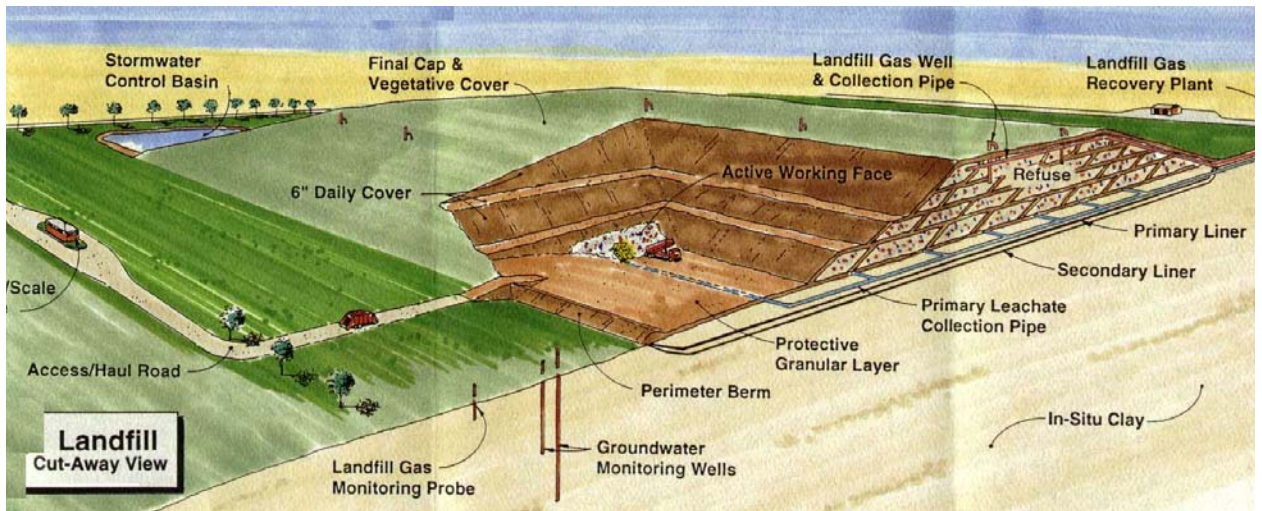
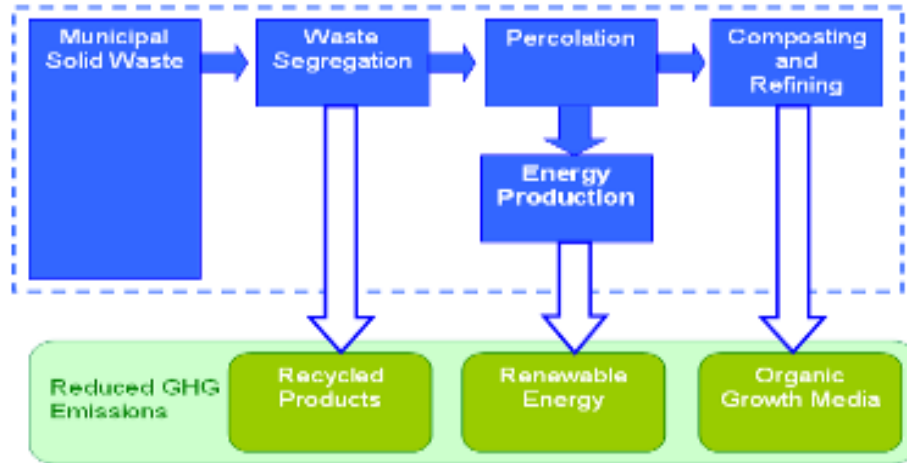


Development of a combined treatment, storage and disposal facility for the hazardous waste.

The project involves a pilot study for feasibility of hazardous waste management facility in Haryana. The project involves expeditious identification of Treatment, Storage and Disposal Facility (TSDF) sites for hazardous waste. The project involves compilation of data regarding quantum of hazardous waste, categorization of waste and assessing the feasibility of developing these sites.

The actual services provided by IRGSSA included compilation of data regarding quantum of HW available to be treated, categorization of this waste for treatment and suitable disposal options, sizing of the facility as a common inter state facility. As a part of the project, detailed cost estimates were carried out for the TSDF facility and for transportation of waste and other issues involved in interstate movement of waste. Legal issues involved in the transportation of HW, cost analysis for individual or common facility and summary of the cost benefit analysis of the various options was carried out. Nodal agencies were identified for setting up the HW treatment facility, including an assessment of the possibility of involving existing users associations and role of other agencies/state. Technical assistance was extended in the step-by-step development of the project.

UR – 3R Process



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