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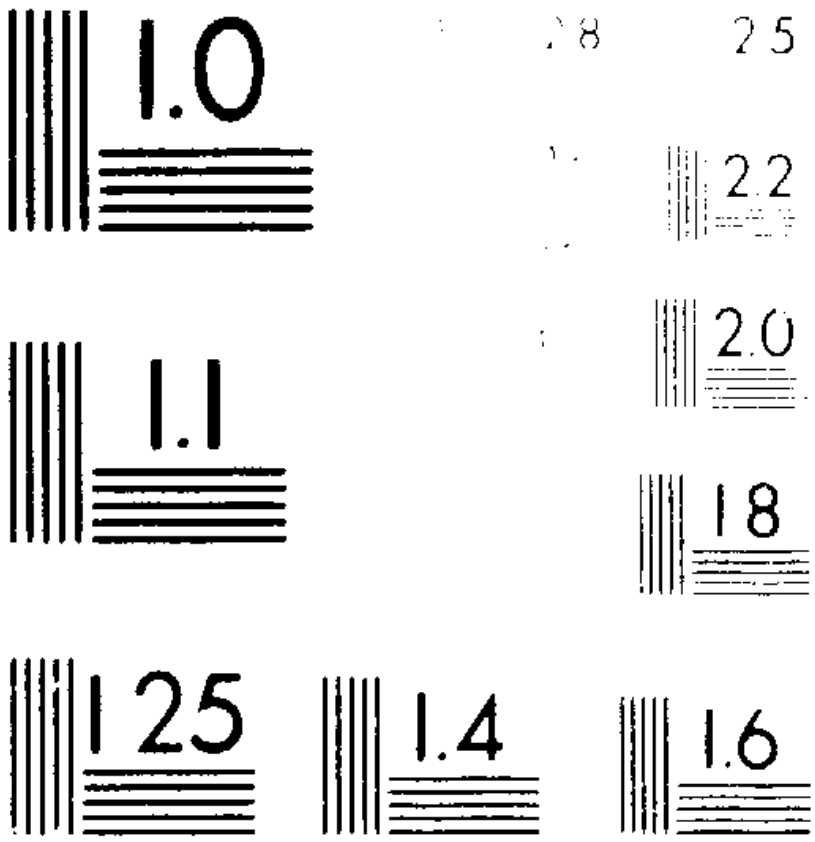
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org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ASSISTANCE TO THE MUNICIPALITY OF DAMASCUS IN THE CONSTRUCTION OF A COMPOST PLANT

SI/SYR/79/802

SYRIA

Technical Report*

27 January - 8 February 1984

Prepared for the Government of Syria
by the United Nations Industrial Development Organization,
acting as executing agency for United Nations Development Programme

Based on the work of John Marriott
Consultant in Compost Production

United Nations Industrial Development Organization
Vienna

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TABLE OF CONTENT

1. INTRODUCTION

From 31 January to 8 February 1984 a visit to Damascus took place for consultations with the Municipality of Damascus and with other Government Authorities on the finalization of the tender document for the construction of a municipal composting plant. I was also asked to advise on any other matter related to the project.

I had some prior and reliable knowledge of this project for the following reasons:

a) - In 1978 I was engaged by Howard Humphreys & Partners, Consulting Engineers (who were then employed by the Ministry of Housing and Utilities to prepare a Master Plan for Sewerage and River Pollution Control in the Cities of Damascus, Homs and Hamma). My function was to technically assess the possibilities of composting sewage sludge with municipal refuse. I spend some weeks in Syria carrying out my investigations, and I later set up and supervised a detailed investigation into refuse yields and composition in each of the cities. The results are recorded in Volume 5 of the Master Plan for Sewerage and River Pollution Control which was submitted to the government in 1978.

b) - In 1980 I was appointed by UNIDO to assist the Islamic Development Bank in an evaluation of the proposals submitted by Tecneco Consultants (as amended by R. Gillet - UNIDO Consultant) for a major composting plant for Damascus. In September 1980 I submitted a comprehensive Report to UNIDO, and I note with satisfaction that most of my recommendations have been adopted.

c) - In the period from 1980 to 1983 a former UNIDO Consultant -(Mr David J. Miles)consulted me from time to time, in a private capacity, to obtain technical information on composting engineering relating to a project of the size of the one proposed.

During this mission I have met and discussed in detail the draft tender documents with:

Dr A. Salem - United Nations Development Programme - Damascus.

Dr Y. Kasab - -ditto-

Mr Nader Haj Oghle - Assistant Director of Technical Services, Municipality of Damascus (and also other members of his staff)

Mr Wafa Zuhair - Civil Engineer, General Company for Engineering and Consulting - Damascus.

I have studied in detail the following documents:

a) - The Project File of the United Nations Development Programme in Damascus.

b) The Reports of the former UNIDO Consultant - Mr D.J.Miles

c) - The Draft Contract and Tender Documents prepared by the General Company for Engineering and Consulting - Damascus.

d) - The UNIDO Model Form of Lump-Sum Turnkey Contract for a Fertilizer Plant (UNIDO/PC25/Rev1E) and the Guide lines to the use of that Form.

The following Documents which are in Arabic have been read to me. In the first instant the Report was explained to me by staff of the Municipality of Damascus, and in the second case the Report was translated and explained to me by Mr Wafa Zuhair of the General Company for Engineering and Consulting - Damascus

a) - Report on Pre-qualification of Contractors for the Composting Plant

b) - Special Report dated December 1983 of the Consulting Engineers on a comparative study of various sites for the Composting Plant.

2. CONTRACT AND TENDER DOCUMENT

The Composting Plant is to be provided by means of a Lump Sum Turnkey Contract by which the CONTRACTOR becomes responsible for the detailed design.

The CONTRACT TENDER DOCUMENT must therefore:

a) - Specify all the matters which the Governate require to be incorporated in the design;

b) - Prescribe the required standards of performance;

c) - Stipulate the data which must be submitted with each tender, and which will later be incorporated in the successful contract;

d) - Indicate the manner in which tenders are to be submitted.

It is desirable that the technical data to be submitted by Contractors be presented in a uniform manner and under selective headings, *in order to facilitate its later incorporation into a* Contract, and to enable the evaluation of the tenders to be carried out in an efficient way.

There are three matters which require attention prior to inviting tenders for the Composting Plant. These are:

a) - Preparation of detailed Conditions of Contract;

b) - Final Selection of the Site; and

c) - Revision of the Technical Specification of Works.

I understand that Conditions of Contract are being prepared locally, but these were not available at the time of my visit. The magnitude, complexity and full equipment of a compost plant (of the capacity which is proposed) will require firm contractual management at all stages. The Governate have already decided to accept tenders for ALL types of composting system, and it is essential that the form of contract to be used shall be as comprehensive and reliable as it is possible to produce, in order to ensure:

a) -Maximum protection of the interests of the Government and the Governate;

b)- Security to the Funding Agencies;

c)- Confidence to Tenderers (which should result in more reliable tenders being received)

In this Report detailed recommendations in respect to the Form and Conditions of Contract are made.

No decision has yet been made regarding the site for the Composting Plant. The Consulting Engineers report dated December 1983 is currently being considered, and it is hoped that a decision will shortly be made. It is important for firm tendering that full details of the site be provided as part of the Technical Specification.
The actual location of a site, and its characteristics, have a large influence on development costs of a plant. Firm tenders cannot be obtained if there is uncertainty about the site.

The Draft "Contract and Tender Document" dated December 1983 and prepared by the General Company for Engineering and Consulting - Damascus (herinafter referred to as "The Specification") represents a reasonable first draft only. It requires considerable editing and technical revision to make its meaning clear and un-ambiguous, and to include important matters which have been omitted. During my stay in Damascus (as the matter of revision is now urgent) I prepared

a PROVISIONAL hand-written revision of the document, which I discussed in general terms with Mr Nader Haj Oghle and members of his staff at the Municipality of Damascus, and at length and in considerable detail with Mr Wafa Zuhair of the General Company for Engineering and Consulting. There was a general agreement with my suggestions and recommendations. I left with each of these genetlemen a copy of the hand-written revisions.

To ensure that the technical data to be submitted by tenderers is presented in a uniform manner (so that it can be incorporated into various Annexures to the Contract; and also to be used for evaluation of the tenders received) I have prepared a series of Technical Data Sheets which list under various headings, the data which is required, and the order in which it shall be presented. These Technical Data Sheets are contained in Schedule 2 to this Report.

In chapter 5 of this report I summarise the principal amendments I have made to the Specification (Draft Contract and Tender Document), while in Schedule 3 these amendments are listed in detail.

3. CONDITIONS AND FORM OF CONTRACT

The Damascus Composting Project is to be implemented by a Turnkey Lump Sum Contract. It is improtant that all contractors are fully informed regarding the Conditions of Contract which are to be used so that they can properly assess their contractual obligations and liabilities.

The essence of the scheme is the provision of a viable fully equipped FACTORY for the conversion of municipal refuse and sewage sludge into a high quality compost. Despite the fact that the technical process of composting is different from that of producing mineral fertilizers, the factory complexes have in each case many similarities. Turnkey Lump Sum Contracts for such plants also create similar problems.

During 1981 the UNIDO MODEL FORM OF TURNKEY LUMP SUM CONTRACT FOR THE CONSTRUCTION OF A FERTILIZER PLANT was finalised by an International Group of Experts, representing experienced purchasers and Contractors from both developed and developing countries.

It is now possible to obtain from UNIDO Headquarters in Vienna, under reference UNIDO/PC.25/Rev.1.E the following document:-

" UNIDO Model Form of Turnkey Lump-Sum Contract for the
" Construction of a Fertilizer Plant, including guidelines
" and technical annexures (298 pages)

This Model Form is a comprehensive document which requires some guidance for its appropriate use by less experienced purchasers. The Guidelines are therefore a supplement to the actual Form of Contract.

The Model Form does not replace the parties' judgement or contractual skills; rather it provides a basis from which a fair balance between obligations, liabilities and financial compensations can be achieved according to particular local requirements and problems. The experience of the Governates' project management team (including outside expertise), and the qualifications and capability of the selected contractor are the essential components for the successful implementation of the project.

The Model Form follows, in general, the methodology laid down in most Turnkey Contracts, although the UNIDO Model imposes more rigid conditions on the Contractor for meeting his obligations, than is usual in most contracts. The Contractor is required, for an agreed Contract Price, to construct a turnkey plant which includes the provision of all the know-how, design and engineering services; to procure, inspect supply and deliver to the site all the equipment; to undertake all civil works, erection and testing of the plant, to commision and start-up the plant (using the staff of the Governate,

(some of which he is obligated to train); and to demonstrate that the plant can reliably produce products of contractual specification and capacity. The Governate would only take over the plant when all this is done.

Under the UNIDO Model the Contractor is NOT left on his own to supply and/or buy the equipment, and build the plant without continuous consultation with the Governate. These consultations will ensure that the Governates interests and requirements are fully taken into account, and that plant layout is designed to take care of future expansion. The Governate would be in continuous touch with the project by:

a) - Specifying the vendors from whom critical equipment is purchased;
b) - Approving all layout plans and site development;
c) - Having direct acces to basic documentation of process licensor(s);
d) - Having the right to inspect at Contractors premises, the detailed engineering and procurement specifications;
e) - Specific approval of ANY changes in technical parameters, equipment and construction materials or specifications;
f) - Independent inspection during manufacture of all equipment;
g) - Following the progress of civil works and plant erection and commissioning, through payments linked to ACTUAL WORK DONE AT SITE.

The Model Form lays great emphasis on the completion of the plant on time, in demonstrating its ability to perform, and on correction of latent defects which appear in a period of 12 months after the plant completed its Guarantee Tests.

The use of the Model Form of Contract ensures that the Governate will be provided with more surety in obtaining a properly working plant.

I strongly recommend that the Governate of Damascus adopt for this Contract the UNIDO MODEL FORM OF LUMP SUM TURNKEY CONTRACT, suitably amended to apply to a Composting Plant.

It may also need to be altered in minor details to make it conform to contractual procedures and regulations of the Syrian Government and the Governate of Damascus.

When I was in Damascus I requested UNIDO in Vienna to send urgently to Mr. Khalil Ayaash, Director of Technical Services at the Municipality of Damascus two copies of the full document (UNIDO/PC25/Rev 1). These should now have been received.

These documents contain extensive GUIDELINES to the use of the Contract Form, and also the complete text of the CONTRACT FORM including the important TECHNICAL ANNEXURES.

In these documents the numbers figures, periods etc mentioned in the various Articles, Clauses and Annexures are entirely illustrative. Those to be incorporated into an actual contract will require to be negotiated or be otherwise individually determined.

The TECHNICAL ANNEXURES to the Contract are intended to detail all the technical parameters of the works, the procedures for implementing the various provisions of the Contract, and the performance guarantees to be demonstrated by the Contractor (including the procedure for proving them).

The Technical Annexures in an actual Contract must be specific to that Contract, and therefore the essential data must be submitted by Contractors with their tenders, or be negotiated before the Contract is finally awarded.

I have very carefully examined the UNIDO Model Form of Contract and I submit in SCHEDULE 1 to this report my recommendations for the detailed alterations and amendments to enable this Form of Contract to be used for the provision of the Composting Plant.

4. THE SITE

The General Company for Engineering and Consulting have prepared a report on a comparative study of several potential sites. The Consultants were instructed by the Governate to consider three sites at

AIN TERMA,

SBENEH, and

JOURENAH.

They however added two further sites at

OTAYA and

NAJHA

In consideration of the merits and disadvantages of the various sites they had regard to:

a) - Area and type of land available.

b) - Nearby residential, commercial and industrial development ,

c) - Environmental problems - existing or potential.

d) - Availability of essential services - electricity, water telephone etc.

e) - Geological conditions and height of water table.

f) - Climatic conditions including strength and direction of prevailing winds at different seasons.

g) - Accessibility and proximity to main routes.

h) - Distance from city centre.

i) - Distance to main user areas for compost.

j) - Distance to landfill site for disposal of un-usable processing residues.

k) - Availability of adequate processing water required for preparation of material for optimum fermentation. (Up to 300,000 litres in 8 hrs will be needed during summer conditions)

l) - Distance from proposed Sewage Treatment Works including methods of transporting sewage sludge for composting

A very careful cost comparision was made of each site. This included:

a) cost of acquisition of land.

b) cost of development and provision of essential services.

c) site factors which will increase or decrease the cost of the civil works in the contract.

e) savings (or increases) in transportation costs of

i) - refuse collection and disposal;
ii) - delivery of compost to agricultural users;
iii) - transport of sewage sludge to composting plant.

I append a Map to a scale of 1 in 100,000 showing the location of the five sites. I was able to visit the THREE sites selected by the Governate during my studies for the Islamic Development Bank in 1980. I then recommended that for management, logistic and operational reasons, and in the interest of minimum cost, a site as near to the proposed Sewage Treatment Works at AIN TERMA as possible should be acquired. The analysis of the Consulting Engineers confirms this recommendation as on comparative costs is is the most economical of all the five sites.

If an index is taken of 100 for the Ain Terma Site the total cost comparative index for the other sites is as follows:

OTAYA	Index 132
SBENEH	Index 157
NAJHA	Index 165
JOURENAH	Index 222

This means that the total cost to the community(both initially and continuing in the future)of the site at Jourenah is almost two and one quarter times the cost of the site at Ain Terma.

It is imperative that a firm decision is made of the site to be used BEFORE THE TENDER DOCUMENTS ARE COMPLETED. The Technical Specification must contain the following data relating to the site

a) - Precise location and area of land available.
b) - Characteristics of the Site.
c) - Topography of immediate adjacent area.
d) - Site levels.
e) - Surface geology and details of local water table.
f) - Availability of process water (non-potable).
g) - Availability of Electricity.
h) - Availability of potable or mains water.
i) - Details of road access.
j) - Facilities for surface water drainage.
k) - Facilities available or needed for sewage disposal.
l) - Features or trees on site which must be retained.

The Site must also be available for inspection by Contractors when they make their own local investigations before submitting their tenders.

There is one further important matter to which I have to direct attention. The Invitation to Contractors to apply for pre-qualification contained the following statement:

> " The site is not definately fixed and it is conceivable that it might be most economic to have the pre-treatment section near the city and the windrow fermentation area in the country near the user area "

I have not seen any further mention of this in any later documents, but I urge that this course be not adopted.

For maximum efficiency and to avoid serious management and operational problems the compost plant must consist of a fully integrated factory. There is an important inter-relationship between each of the stages of processing, and many of the primary residues can usefully be re-processed through the plant with subsequent benefit to production, and with saving in costs. This re-processing of residues particularily applies to those derived from the final cleaning stages, where large lumps of congealed compost can most easily be treated by passing them through the plant once more.

5. SUMMARY OF COMMENTS ON CONTRACT AND TENDER DOCUMENT.

In a Turnkey Lump Sum Contract the Governate has substantial power under the Model Form of Contract in requesting changes, but it should be clearly understood that any change which increases the cost or which may result in abortive expenditure by the Contractor will have to be paid for by the Governate.

It is therefore absolutely essential for the Governate, before signing a turnkey contract to carefully check that all technical specifications included therein,(particularily the design basis, the equipment specifications, civil works and erection specifications, and the feedstock, throughput and compost requirements) are accurate and reliable.

The Draft Tender Document prepared by General Company for Engineering and Consulting formed a useful basis from which the final Technical Specification could be derived, but in its present form its requires clarification by substantial editing, the insertion of essential matter not already included, and emphasis on a number of items particularily those relating to performance requirements.

My suggested re-drafting covers all the fore-going points, but the general sense and objective of the original document has been retained.

The decision already taken on the pre-qualification of Contractors is that no restriction will be placed on the submission of tenders for ANY system of composting - Enclosed, Accelerated or Windrow. Consequently it is important that the Tender Specification is drafted sufficiently wide to cover the essential requirements for any of these systems.

The most important objectives are:

a) The Plant will regularly and efficiently treat the input of waste which is specified, within the time stated.

b) The Plant must be capable of treating UN-SORTED refuse as it is delivered thereto.

c) The refuse must be thoroughly (and not partially) fermented before it is stacked for maturation.

d) Maturation must be thoroughly done to produce a stable compost which will not damage soil or crops.

e) - The final cleaning and grading of the compost must be efficient and thorough, so as to consistently produce a high quality product which is acceptable to the user.

f) - The TOTAL cost of production of the compost (including the amortization of capital) must be reasonable in order that the price at which the compost can be sold is commercially viable.

I have emphasised all these objectives in the re-drafted Technical Specification.

The process of composting is essentially a BIOLOGICAL one, and so whatever system of composting is used the machinery equipment and technology which is employed is designed only to create optimum conditions for rapid bacteriological and fungicidal action.
The important stages are as follows:

a) - Preparation of the refuse and sewage sludge so that it is in a condition to accelerate bacterial action. Shredding or pulverisation reduces the material in size, entrains oxygen into the mass and effects some degree of mixing.

b) - Bacteria can only thrive and multiply by the use of nutrients which they obtain from the refuse and sludge. They can ONLY absorb this in a LIQUID state and consequently correct moisture balance is a vital factor in efficient composting.
The optimum level is 55% w/w. At levels below this the process slows down and stops all together at about 12%w/w.
At levels higher than 55% w/w the material becomes increasingly water-logged and this prevents access to the next important element - namely oxygen.

Correct moisture adjustment prior to the fermentation stage is important.

c) - For efficient fermentation the process must be maintained in an aerobic condition in order that the bacteria have access to an ample supply of oxygen. The process is characterised by a rapid increase in temperature up to a level of about 70°C. This effects a degree of pasteurisation.

The efficiency of aeration of fermenting compost is vital for successful composting.

d) After the fermentation stage the compost must be allowed to cool to a level where it will not damage the soil or crops. In this important maturation stage other biological processes continue producing eventually a stable compost.

Maturation or curing must be thoroughly carried out.

All these points have been incorporated into the re-drafted Technical Specification (Contract Tender Docuemnt).

For the prevention of environmental nuisance - especially arising from fly and insect infestation the facilities for the reception of refuse and its temporary storage prior to processing must be carefully designed. Refuse when collected is already infested with the eggs and larvae of flies and often when delivered at a plant large numbers of live flies are emerging from the refuse.

In dry weather the emmission of dust during delivery of the refuse from vehicles can cause problems.

In the re-drafted Technical Specification (para 4.10) I have directed specific attention to these problems.

The processing machinery requires a steady continuous feed of refuse, but refuse is delivered to the plant at variable rates during the full 24 hours each day and during seven days each week.

It is proposed that the plant will operate eight hours per day and six days each week (the seventh day being used for plant cleaning and regular maintenance). It is essential therefore that adequate but not excessive temporary storage be provided.

In the re-drafted Technical Specification (para 4.12) I have emphasised this matter.

The time required to produce a high quality compost from municipal refuse can vary according to the efficiency of different systems of composting, and also by reason of climatic conditions at different times of the year. The yield of compost from each tonne of refuse is also variable.

Some compost plant manufacturers give reliable information on these points but others have a tendency to quote un-realistic performance characteristics of their plants.

It is important that at the tender stage specific information be provided by each tenderer on these matters and therefore I have attached to page 3 of the re-drafted Technical Specification a schedule of additional data which should be provided by each tenderer.

This information will require to be carefully evaluated when the tenders are being considered, particularily to determine if the information given is realistic or is questionable.

I have completely re-drafted Annex III of the Technical Specification in order to present this in the form acceptable and understood by Contractors.

Design Information must be included. This must be reliable and given in good faith, BUT WITHOUT ANY WARRANTY OF ACCURACY. Tenderers must themselves determine the reliability of the data and/or obtain their own design information

In the original draft the characteristics of refuse as stated in the 1978 tecneco Report was used. In my 1980 report to the Islamic Development Bank I questioned the accuracy of the information

on this subject which was contained in the Tecneco Report, especially having regard to the results which was obtained by the detailed investigation and analysis made of the yield and composition of Damascus refuse by Howard Humphreys & Partners as part of Master Plan for Sewerage and River Pollution Control.

A former UNIDO Consultant checked the Howard Humphrey results and made some slight amendments thereto.

I am satisfied that that data is the most reliable and accurate which is currently available, and accordingly I have incorporated this in Annex III - Design Information.

Data is required of the general pattern of deliveries of refuse to the plant during the 24 hrs each day. I have included a suggested form of presentation of this information in Annex III

An important factor in the design of a composting plant is knowledge of the seasonal variations in climatic conditions at the COMPOST PLANT SITE. The main factors are prevelant and strong winds, Humidity, Rainfall and Temperature. I have included a suggested form of presentation of this information in Annex III.

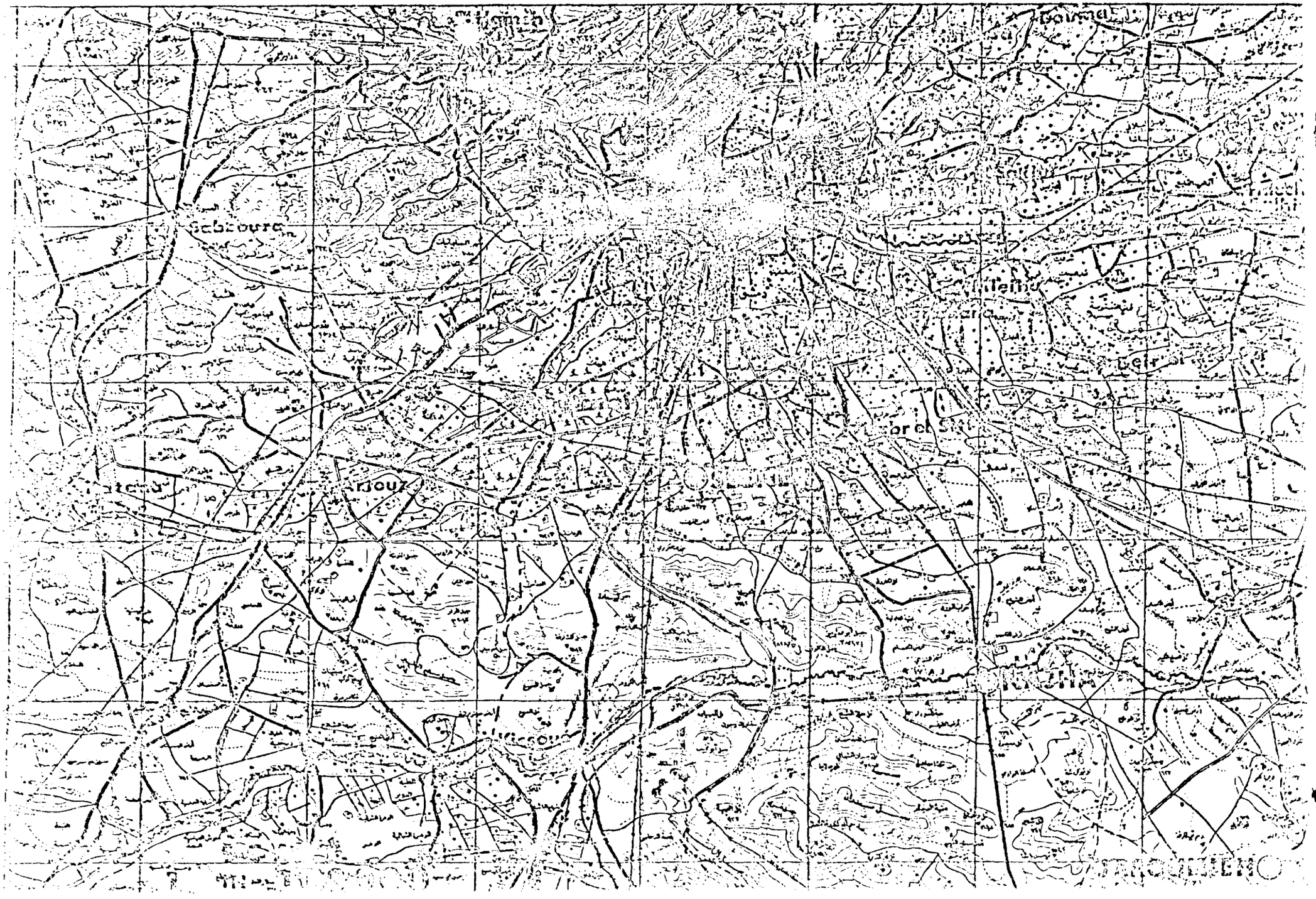
The different stages of the composting process require very variable periods of time. Ideally the final Performance Tests on the plant should take a full weeks input to the plant and follow it through to its completion as a compost awaiting sale. Each stage of the process being carefully monitored and evaluated. I have therefore added a further Annex - Annex XII setting out in detail the duration of the performance tests on each part of the completed plant.

6. MISCELLANEOUS

If the Governate agree to use the UNIDO Model Form of Contract further UNIDO assistance may be required.

The technical evaluation of the tenders to be received will be a complex operation having regard to the wide range of composting sysytems which may be offered. In order to ensure a comprehensive review and analysis of each tender, and on a uniform basis, a detailed scheme of examination should be prepared and the necessary analysis forms drafted. This will take time and should be completed before the date for return of the tenders. If called upon I am willing to assist in this work.

The re-drafted Technical Specification is submitted to the Governate and its Consultant for consideration. They may wish to make further amendments and alterations.



SCHEDULE No 1.

RECOMMENDED ALTERATIONS TO APPLY THE UNIDO MODEL FORM OF CONTRACT TO THE CONTRACT FOR THE PROVISION OF A COMPOSTING PLANT FOR THE GOVERNATE OF DAMASCUS

Page	Para	Line	
			Article 1
86	1.1.	1	Insert Full title of Purchaser
86	1.2.	1	Insert Name and Address of Contractor
86	1.7.	-	Delete the whole paragraph
86	1.4.	1 & 2	For "Ammonia and Urea Plants" Read "Composting Plant For "XVI"Read "XII" FOR "XXX" Read "XXIII"
87	1.8.	1	Insert after "fcundations" the words "fencing,site equipment"
87	1.9.	2	For "ammonia and urea" Read "compost"
88	1.18.1.		Delete the whole sub-paragraph
88.	1.22	2	Delete all the clause after the words "has been completed"
89	1.27	1 & 2	Delete the words "each individual plant and"
		3	Substitute"25"for"36"
89	1.28	1	For "ammonia" Read "composting" and delete the words "the Urea Plant, and the off-sites"
89	1.28.1 1.28.2 1.28.3	- - -	Delete these sub-paragraphs
89	1.29	2. 2. 1.	For "ammonia" Read "Composting" Delete"and the urea produced in the urea plant" For "ammonia and carbon dioxide" read "compost and saleable /rejects"
90	1.33	2	For " Annexure I" Read "Annexures I and III"
90	1.35	3	For "products" Read "compost"

Article 2

91	2.1.	2	Insert after "integrated" the words"Twin-Line"
		3	For "ammonia and (prilled/uncoated) urea" Read "high quality mature compost" For "off-sites" read "equipment"
		5	Insert between the words "and know-how"the words "supply of"
		8	Delete the remainder of the paragraph and substitute "..... to demonstrate the ability of the plant to continuously produce the maximum yield of high quality mature compost from the processing of an input during a shift of eight hours each day and six days each week (312 days per year) of RATED THROUGHPUT of: 700 tonnes (2400 cubic metres) of UNSORTED municipal refuse and 300 tonnes (400 cubic metres) of semi dried sewage sludge (66.6% w/w moisture) AND/OR the maximum amount of liquid sewage sludge (97%w/w moisture) which can be incorporated in the refuse to ensure successful fermentation."

Page	Para	Line	
91/92	2.4.	-	NOTE All the figures are illustrative only Actual figures will be inserted from succesful tender.

Article 3

93 Insert New Commencing Paragraph to be numbered 3.1 and renumber subsequent prapgraphs accordingly The new paragraph is as follows

3.1. The Contract will include for the provision of

1. All fixed mechanical and electrical plant;
2. All mobile plant and vehicles including:-
   - a - Four Wheel Drive Loading Shovels (with 3 cub metre buckets fitted rapid action retaining clamps) required for handling and loading refuse and compost .
   - b - Compaction type Bulk Refuse Transportation Vehicles for taking process residues to landfill. (30 km distant)
   - c - Rough Terrain Dump Trucks for delivery of compost to users (Average haul 15 km)
3. All buildings and structures including:-
   - a - Adminstration offices
   - b - Amenity block
   - c - Workshop and stores
   - d - Gate House
   - e - Reception Hangar, Milling Hall, Fermentation Unit and all other buidings and structures required to accommodate the processing plant.
4. A central 40 tonne capacity weighbridge with control office.
5. All security fencing and gates.
6. Adequate artifical lighting to external areas.
7. All Maturation, Stockpile and other processing areas external to buildings, and all internal roads and vehicle parking areas to be properly formed constructed surfaced and drained.
8. All internal site services to include:-
   - a - Electricity Supply for light and power.
   - b - Water supply for drinking, sanitation and processing
   - c - Surface Water and Foul Water Drainage.
   - d - Fire protection and alarms.
   - e - Tannoy service.
   - f - T.V. Monitor for critical points.
9. All essential servicing equipment, tools and spares for maint of fixed and mobile plant /ainance
10. All essential equipment and chemicals to establish a suitable Plant Laboratory.
11. All Site Landscape works including the provision of adequate wind breaks.

Page.	Para.	Line	
93	3.1.2.	4	Insert the word "mass" after the word "Material"
		8	Delete the word "steam" after the word "Electric"
		9	Delete the whole line
93	3.1.4.	1	For "Battery Limits" Read "Site"
93	3.1.6.	1	Insert after"Equipment" the words "(fixed and mobile)"
		6	Delete " X and XI"
94	3.1.15	-	Delete the whole paragraph and substitute " Provision of adequate electricity supply to the site"
94	3.1.17	1	Delete the whole of the paragraph after the words "Civil Works"
94	31.18	1	Amend to read "Construction of Gate House for security personnel"
94	3.1.19	-	Delete whole sub-paragraph and renumber subsequent ones
95	3.1.26	1	Delete the word "Chemicals"
		2	Delete the words "including outside purchased utilities"
95	3.2.1	2	CAREFULLY CHECK THAT CORRECT ARTICLE NUMBERS ARE INSERTED.
96	3.2.2.	-	Delete TEXT B
96	3.2.4.	4	Delete all the remainder of this paragraph after the words ....."shall be required"
96	3.2.5.	3/4	For "battery Limits" Read "Site"
97	3.3.	1.	Delete the words "within the Battery Limits"
			Article 4
98	4.2.	4	For "XV" Read "XI"
98/99	4.4.	-	Delete TEXT A
100	4.5.	2/5	Delete in second line the words "as follows" Delete The third fourth and fifth line relating to ammonia plant, urea plant and water treatment.
101	4.8	5	Delete the word"expressed" and substitute and insert the words "regarding agreements for sub-contracting and equipment supply"
101	4.9	4	Delete"X and XI"
		5	For "XIII" Read "X"
102		1	Delete "and XIII"
102	4.9	3	Delete after the words "production of" the remaindor of the paragraph and substitute the following text "....production of high quality mature compost from theprocessing in a shift of eight hours each day and six days per week (312 days per year) of 700 tonnes (2400 cubic metres) of unsorted muncipal refuse and 300 tonnes (400 cubic metres) of semi-dried sewage sludge (66.6%w/w moisture) and/or the amount of the liquid sewage sludge (97%w/w moisture) which the process can absorb excluding those items which are the PURCHASERS responsibility as specified in Article 5 and other exclusions as may be expressed in the Contract."
102	4.11	3	For "XXVI" Read "XX"
103	4.18	-	Delete the whole paragraph and substitute The Contractor shall be responsible for the design and construction of all roads, parking areas, and external processing and storage areas within the site of the plant"

Page	Para	Line	
103	4.19	2/3	Delete after the word"machinery" the words "and piping layout, and road and rail layouts" and substitute and insert the words "conveyors and utilities layout; andraod,parking area , processing area and storage area layouts "
103	4.20	2	After the first sentence delete remainder of paragraph
104	4.23	2	Delete "and in Annexure XXIX"
104	4.27	1	Delete the word "While"
			Delete the word "chemicals"
			Insert between the words "feedstock, outside" the word "and"
		2	Delete the words "and other materials"
		3/5	Delete the remainder of the sentence after "Article 5.8"
		8.	For "XXXI" Read"XXIV"
105	4.29	5/6	Delete the words "chemicals and other agreed materials"

NOTE: the periods mentioned in Clauses 4.25; 4.27; and4.29 are illustrations. Correct figures to be inserted from tender.

Article 5

108	5.1.	5	For "XV" Read "XI"
109	5.8.	1	Insert the word "and" between"feedstocks, outside"
			Delete the word "chemicals"
		2	Delete the words "except the"
		3	Delete the whole line
		4	Delete the whole line
		5	Delete the whole line
		9	Delete the words"chemicals and other"
109	581	-	Delete whole paragraph and substitute

"The feedstock will consist initially of unsorted municipal refuse of a variable nature, composition and density, and delivered to the plant under the normal refuse collection operations of the City of Damascus. Sewage Sludge is not currently available but the plant must have the capacity to deal with this during its lifetime. The AVERAGE composition and density of municipal refuse has been determined by careful investigation and is recorded in ANNEXURE II. It must be noted that each load of refuse will vary, and that there will be marked seasonal variations. The plant MUST be flexible in operation and fully capable of accommodating these variations in the composition and density of the feedstock"

109	5.9	-	Delete TEXT B

NOTE: The periods mentioned in Clauses 5.6 and 5.8 are illustrative. Correct figures to be inserted from tender.

Article 6

111	6.3.	-	SEE FOOTNOTE TO THIS PAGE

IT is important that if both an Engineer and a Project Manager are appointed their names and addresses are recorded in this paragraph.

115	6.16	2	The actual number of engineers to be determined by the Governate and recorded in this clause.
		5	For "XV" Read "XI"

NOTE: The period in Clause 6.8 is illustrative. The agreed figure to be inserted.

Page	Para	Line	ARTICLE 7.
116	7.3.	-	DELETE Text A
119	7.11.	-	DELETE Text A
120	7.15	-	DELETE Text B

ARTICLE 11

124	11.1	2	FOR "XV" READ "XI"

ARTICLE 12.

125	12.1.2.	4	DELETE the final sentence
125	12.1.5.	3	FOR "chemicals" READ "materials
126	12.1.8.	-	DELETE the whole clause.
126	12.1.9.	-	DELETE the whole clause.
126	12.1.10	2	DELETE all words following "Plant"
		1	INSERT after "Materials" the words"other than feedstock"
126	12.2.1.	3	FOR "XXIV" READ "XVIII"
128	12.3.1.	2	FOR "XV and XXI" READ "XI and XV"
129	12.4.1.	7	FOR "XXV" READ "XIX"
129	12.4.2.	1.	FOR "goods and supplies"READ "equipment and materials"
129	12.5.	1	From the title DELETE "Railway Sidings"
129	12.5.2.	3/6	DELETE the final sentence
130	12.5.3.	-	DELETE the whole clause
130	12.5.4.	-	DELETE the whole clause
130	12.6.1.	5/7	DELETE from the end of the first sentence after the words "within the" on the fifth line the remainder of the sentence and SUBSTITUTE "site, (inclusive of factory and utitlity buildings, fencing and gates, roads and paved areas, internal services, windbreaks and landscaping, etc)"
		8	FOR "XXVIII" READ "XXII"
131	12.6.2.	9	FOR "XXVIII" READ "XXII"
		14	- ditto -
133	12.7.1.	2	FOR "Battery Limits" READ "Site"
133	12.7.1.6.	1	DELETE "offsites"
133	12.7.1.9.	2	INSERT after the word including the words "dust aspiration system" DELETE the word "and"
		3	ADD at the end of the sentence the words "and all control and monitoring equipment"
133	12.7.1.11	1	INSERT after "all" the words"Firefighting, fire alarm,"
133	12.2.1.12	2	DELETE all words after the word "Plant" including sub-clause 12.7.1.12.1.

Page.	Para.	Line.	
			ARTICLE 14
142	14.10	3/4	DELETE the words "as detailed in Annexure XXIX"
			ARTICLE 15.
146	15.12.	2/3	AMEND Annexure Numbers to read III,IV,V,VIII, IX,X,XII,XV,XXII,XXIII,and XXIV
145	15.5.	5	DELETE the word "piping"
			ARTICLE 16.
147	16.2.	3	FOR "XVIII" READ "XIII"
147	16.3	2	- ditto -
147	16.4.	8	-ditto -
			ARTICLE 18
152	18.6.	2	DELETE "of the off-sites"
152	18.7.	1	DELETE "and each section of the off-sites"
		3	DELETE " of such" AND "and making of such tests as are detailed"
		4	DELETE " in Annexure XX"
		6	FOR " Ammonia" READ "Composting"
		7	DELETE "the URea Plant, the power plant" AND "and Off"
		8	DELETE "sites"
		12	DELETE " and off-sites"
153	18.11	2	FOR "ammonia and urea are" READ "compost is"
		3	INSERT "28" before "days" and "95 before "%"
153	18.12	3	FOR "XXX" and "XXI" READ "XXIII" and "XXIV"
153	18.13	4	- ditto -
154	18.14.6.	2	- ditto -
			ARTICLE 19.
137	19.1.	-	DELETE Text A
			ARTICLE 20
NOTE:	This is a very important ARTICLE and should be amended as necessary by the Governate.		
160	20.2	3/5	DELETE the tabulated final three lines
161	20.7	2	FOR "XVIII" READ "XIII"
163	20.14.1.3.	2	FOR"Urea" READ "compost" (ALSO 20.19.8 Line 6)
164	20.15.2.	1	FOR "XVIII" READ " XIII"
167	20.19.12	3	- ditto -
169	20.23	9	FOR "XXIII" READ "XVII"
169	20.23.3.	2	- ditto -

Article 24

176	24,4,1	4	Delete "while"
177	24.4.3.	3/4	Delete "including boilers, pressure vessels, turbines"

Article 25

179	25.2.	8	For "Ammonia/Urea" Read "Composting"
179	25.2	2	FOR "XXVIII and XXIX" READ"and XXII"
179	25.2.1.	7	- ditto -
180	25.4	6	FOR "Annexures XXVIII and XXIX" READ "Annexure XXII"

Article 26

181 26.1. Delete all the Paragraphs 26.1.1. to 26.1.6 and substitute the following:

26.1.1. The percentage yield of specification grade compost of the composting plant in relation to input of feedstock shall not be less than that specified by the Contractor at time of tender and recorded in Annexure IV.

26.1.2. The plant, its components and ancilliary equipment shall be adequate to maintain sustained and continuous operation at the rated throughput specified in Para 1 Annexure I; and each seperate flow line (or 50% of the plant) shall be capable of processing the 8 hour shift rated throughput in a double shift of 16 hours.

26.1.3. The quality of the compost from the composting plant shall be in accordance with Annexure XII.

26.1.4. The total time required to produce specification grade compost shall not exceed that specified by the Contractor and recorded in Annexure IV.

26.1.5. Total power consumption shall not exceed that specified by the Contractor at the time of tender and recorded in Annexure IV.

26.1.6. The Plant shall operate without environmental nuisance caused by noise, vibration, dust, smell or pest infestation.

182 26.3.1. Delete all the paragraphs 26.3.1.1. to26.3.1.4. and substitute

26.3.1.1. 95 per cent of the guaranteed yield of compost specified in Article 26.1.1.

26.3.1.2. 95 per cent of the guaranteed throughput specified in Article 26.1.2.

26.3.1.3. Complete compost quality as specified in Article 26.1.3.

182 26.3.2. Delete all the paragraphs 26.3.2.1. to 26.3.2.5. inclusive and Substitute

Substitute Paragraphs

26.3.2.1. The perecntage yield of specification grade compost if below 100 per cent and not less than 95 per cent of that required by Article 26.1.1.

26.3.2.2. The th oughput of the plant or of any of its ancilliary equipment or its components if below 100 per cent and not less than 95 per cent of its rated throughput.

26.3.2.3. The adequacy of the ancilliary equipment and the cleaning grading bagging and distribution plant to sustain the continuous production of specification grade c ompost at 100 per cent capacity.

183 26.3.3. Delete all the paragraphs from 26.3.3.1. to 26.3.3.5 and substitute

26.3.3.1. Time in EXCESS of that required by Article 26.1.4. to produce specification grade compost.

26.3.3.2 Power Consumption in EXCESS of that required by Article 26.1.5.

26.3.3.3. Non-compliance to acceptable public health standards with the environmental guarantees contained in Article 26.1.6.

184 26.4.1. 1, In the title for "ammonia" Read "Composting"

2 For "Ammonia" Read "Composting"

26.4.1.1. and 26.4.1.2. Delete complete paragraphs and substitute

26.4.1.1. A minimum sustained test under normal operating conditions, of the FULL PLANT (including all flow lines) for each of six consecutive days with an eight hour shift each day to demonstrate the the capability for steady operation at 100 per cent rated throughput capacity (Para 1 Annexure I)

26.4.1.2. A minimum sustained test under normal operating conditions of EACH of the twin-flow lines (or each 50 per cent of the plant if more than two flow lines) for each of three consecutive days with a sixteen hour shift each day, to demonstrate the capability of steady operation at 100 per cent of rated capacity (Para 1 Annexure I)

26.4.1.3 A sustained test through one eight hour shift of the Full Plant at a throughput rate 10 per cent in excess of rated capacity throughput

26.4.1.3. The processed feedstock from each throughput test shalll be kept seperate for fermentation, maturation and Cleaning and Grading and these processes shall be tested to determine the overall performance of the plant and its capability of producing specification grade compost on a continuous basis.

26.4.1.4. Throughput tests shall be conducted on the cleaning and grading plant as for the main processing plant

184 26.4.2. Delete whole paragraph

Page	Para	Line	
185	26.4.3.		Delete whole Para graph
185	26.4.4.		Delete whole paragraph
185	26.4.5.	2	FOR "XXXI" READ "XXIV"
186	26.4.6.	1	For (10) read six
		9	For (7) read three
187	26.7.		Delete TEXT B

Article 27

188	27.1.1.	2	FOR "XV" READ "XI"
188	27.2.	6	Delete the word "as"
		7	Delete the word "Follows:"
	27.2.1.		Delete whole paragraph
	27.2.2.		Delete whole paragraph
189	27.2.3.		Delete whole paragraph
	27.2.4.		Delete whole paragraph
	27.2.5.		Delete whole paragraph
	27.2.6.	3	For "capacity of the Ammonia Plant Read" of the production yield of compost"
		5	After the word "production" insert the words " of compost"
			Delete the word "of" at end of line
		6	Delete the word "ammonia"
190	27.2.7.	3	Delete the words "capacity of the urea plant" and read "of rated throughput of composting plant"
		3	Delete 0:4% and read 1%
		5	Delete"production" and substitute "throughput"
		5	For "capacity of urea" Read "rated throughput of composting plant"
190	27.2.8		Delete whole clause
190	27.2.9.		Delete whole clause
190	27.2.10	1	For "off-sites" read" fermentation, maturation, storage, cleaning grading and bagging units"

NOTE: The periods and times mentioned in the clauses of this Article are illustrative and the correct figures are to be inserted from the tender

Article 28

193	28.5.	Delete TEXT B

Article 30

197	30.2.	Delete TEXT A

Page.	Para	Line.		
198	30.5.		Delete	TEXT A.
199	30.7.		Delete	TEXT A
		Article 32		
204	32.6.		Delete	TEXT A
		Article 33		
207	33.5.2.1.		Delete	TEXT B (5th Line - FOR "XV" READ "XI")
207	33.5.2.3.		Delete	TEXT B
		Article 34		
211	34.5		Delete	TEXT B
		Article 38		
218	38.7.	1	Delete	the word "and" at the end of the line
		2	Delete	the words "intermediates in the international market"
		Article 40		
221	40.2.		Delete	TEXT B

TECHNICAL ANEXURE - AMENDMENT AND ALTERATION

Annexure No		
I	Brief Description of Plant	Delete and insert NEW TEXT

ANNEXURE I

BRIEF DESCRIPTION OF THE PLANT

1. The object of this Contract is to establish a COMPOSTING PLANT to be located in Damascus in the Syrian Arab Republic. The plant shall be at least twin-line and be capable of processing in an eight hour shift each day and for each of six days each week:

700tonnes (2400 cubic metres) of municipal unsorted refuse,

and

300 tonnes (400 cubic metres) of semi-dried sewage sludge (66.6% moisture w/w) AND /or alternatively at will the incorporation in the composting process of the maximum amount of liquid sewage sludge (97% moisture w/w) necessary for succesful fermentation.

N.B. There is no sewage treatment plant at present but this will be constructed during the life of the composting plant

2. The plant shall be designed to make adequate provision for the essential stages of composting and include:

a - Reception and temporary storage of incoming refuse,

b - Flexible feed arrangments to the processing plant,

c - Primary pulverisation, milling, shredding and size reduction,

d - Moisture adjustment of prepared refuse,

f - Fermentation to ensure at least minimum pasteurisation for four full days at a temperature of at least 60°C,

g - Maturation or curing to ensure a fully stabilsed compost,

h - Final cleaning and grading with provision to bag at least 10% of production,

i - Disposal of processing rejects and residues,

j - Disposal of recovered metal and other materials,

k - Distribution and marketing of finished compost.

3. The plant shall be designed to facilitate any necessary extension to permit the throughput being doubled by means of two shift working (sixteen hours day)

4. The plant must be capable of producing reliably, continuously and economically the maximum possible yield from the available feedstock of high quality compost which must be:

a - Properly pasteurised during fermentation,

b - Throughly fermented prior to maturation,

c - Fully matured and stabilised before sale,

e - Free from hard particles and foreighn matter larger than 10mm,

f - Have no visually detectable large glass or ceramic splinters and generally no such particles of larger size than 1mm

g - Be of two grades:

Medium - up to 20mm and Coarse from 20 to 40 mm

The main requirement is that ALL compost before distribution shall be FULLY mature and stable. After the fermentation stage ALL the compost must be throughly matured in windrows or in stock-piles. Assessment of stability will not be restricted to colour, general appearance, lack of odour, or presence of an earthy smell, but it will also be determined by the temperature of compost in stock-pile which must not exceed 40°C, and show no increase in temperature when it is subject to a further attempt at fermentation under optimum conditions.

5. The contract will include for the provision of

1. All fixed mechanical and electrical plant;

2 All mobile plant and vehicles including:-

a - Four Wheel Drive Loading Shovels (with 3 cub metre buckets fitted rapid action retaining clamps) required for handling and loading refuse and compost .

b - Compaction type Bulk Refuse Transportation Vehicles for taking process residues to landfill. (30 km distant)

c - Rough Terrain Dump Trucks for delivery of compost to users (Average haul 15 km)

3 All buildings and structures including:-

a - Adminstration offices

b - Amenity block

c - Workshop and stores

d - Gate House

e - Reception Hangar, Milling Hall, Fermentation Unit and all other buidings and structures required to accommodate the processing plant.

4 A central 40 tonne capacity weighbridge with control office.

5 All security fencing and gates.

6 Adequate artifical lighting to external areas.

7 All Maturation, Stockpile and other processing areas external to buildings, and all internal roads and vehicle parking areas to be properly formed constructed surfaced and drained.

8. All internal site services to include:-
   a - Electricity Supply for light and power.
   b - Water supply for drinking, sanitation and processing use.
   c - Surface Water and Foul Water Drainage.
   d - Fire protection and alarms.
   e - Tannoy service.
   f - T.V. Monitor for critical points.

9. All essential servicing equipment, tools and spares for maintenance of fixed and mobile plant

10 All essential equipment and chemicals to establish a suitable Plant Laboratory.

11 All Site Landscape works including the provision of adequate wind breaks.

ANNEXURE II - BASIS OF DESIGN DELETE WHOLE TEXT AND SUBSTITUTE

ANNEXURE II

BASIS OF DESIGN

The information contained herein is given in good faith and it is considered to be reliable, BUT NO WARRANTY IS GIVEN AS TO ITS ACCURACY.
Tenderers are required to obtain their own information.

1. Refuse Characteristics

(a) Composition of Refuse (Average)

Compostible	% by weight
Food vegetable and organic matter	37
Paper and Cardboard	19
Bones and carcases	3
*Fine material (under 200mm)	21
Compostible Matter	80% w/w

* Organic content of approximately 60%w/w

Non-compostible	
Metals and Cans	3
Ceramics and Glass	3
Textiles and Rags	7
Plastics and Rubber	3
Stones and Timber	2
Miscellaneous	2
Non-compostible Matter	20 %w/w

(b) Density of Refuse

The density of Domestic Refuse will vary (according to season) from 300kg/m^3 to 400kg/m^3

(c) Moisture Content

The moisture content varies (according to season) between 25%w/w and 40%w/w

(d) Refuse Generation

The refuse consists of normal "Domestic" and "Commercial" wastes together with Market Wastes and Street Sweepings.

It does not contain Industrial, Constructional, Demolition, Toxic or Hazardous Waste.

2. Sewage Sludge

There is no sewage treatment plant at present bu provision must be made to process sludge from sewage treatment works which will be constructed during the life of the plant. It will be in two forms:

(a) Thickened Semi-dry Primary Sludge with a moisture content of about 66.6%w/w

(b) Liquid Primary Sludge with a moisture content of about 97%w/w

3. Meteorological Data

Meteorological data for at least 10 years should include:

(a) Available Average Data

The available meteorological data for Site (or the nearest station to site) should contain the following information for

	Summer April to September	Winter October to Mar
(i) Daily average maximum temperature, °C.		
(ii) Daily average minimum temperature, °C.		
(iii) Monthly rainfall, mm.		
(iv) Dry and wet bulb (°C), preferably both for morning (indicate time) and afternoon.		
(v) Prevailing wind direction, (if available, a complete thumb-card indicating the yearly average occurences of winds in the prevailing direction should be attached).		
(vi) Average wind velocity km/hr		

(b) Extremes recorded

This should contain data on the extremes recorded and when, for:

(i) Maximum temperature, °C.	
(ii) Minimum temperature, °C.	
(iii) Maximum rainfall recorded in 24 hours.	(Indicate one and two hourly intensity.)
(iv) Maximum recorded wind valocity. km/hr	

4 Soil and seismic Conditions

These should include:

(a) The type of soil conditions.

(b) The sub-soil water table level at Site (indicate whether water is sweet or saline).

(c) The load bearing capacity in the area. If the soil bearing capacity differs considerably in various places of the plot, a plot plan indicating drilling points and findings should be attached.

(d) Any available data on earthquake in or near the Site and seismic design data commonly used in the area.

5. Refuse Deliveries

The Damscus Refuse Collection Service operates 24 hours per day and seven days per week with peak deliveries around noon and midnight.

The average pattern of deliveries is as follows

	No of Loads	Tonnes	Cubic Metres
0200 to 0600 hours			
0600 to 1000 hours			
1000 to 1400 hours			
1400 to 1800 hours			
1800 to 2200 hours			
2200 to 0200 hours			
Totals	Approx 240	700	2400

6. Reception Storage

The minimu capacity of temporary storage of refuse to be not less than 3000 cubic metres.

7. Characteristics of Utilities

7.1. Electric Power Available Electric Power has the follcwing characteristics

(Indicate voltage, phases, cycles, 3 04 4 wire system including voltage and frequency fluctuations)

7.2. On-Site Electric Generation The OPTIONAL GENERATION EQUIPMENT shall be capable of maintining the throughput of the plant using one flow-line for an extended period.

7.3. Water Supply

Process Water (specify potential source and quality and quantity)

Drinking & Sanitation (Specify source, quality and quantity)

Fire-fighting and Plant Cleansing (Specify source and quantity)

(If piping, pumping and site storage is needed - this must be stated)

8. Restrictions on Transportation of Equipment to Site

Data should be given to include:

a) - Maximum Lift available at Port (If ships derricks can be used this should be stated.

b) - Maximum dimensions and weight which can be carried by road from Port to the Site including any restrictions by bridges or tunnels.

8 Statutory Regulations

The statutory regulations relating to standards or other codes, or Factory Ac applicable in the PURCHASER's country should be specified herein. This particularl refers to acceptance procedures applicable for endorsement of foreign standards prior to manufacture of the Equipment. If necessary translation of local standards and regulations should be prepared and annotated to point out differences and permissible exceptions for imported quipment.

ANNEXURE III — DELETE whole of Text entitled "Battery Limits of the Plant" AND SUBSTITUTE New text(appended below) and entitled

"The Site of the Composting Plant"

NOTE: The Text will be completed after the Site is finally sellected.

ANEXXURE III

THE SITE OF THE PLANT

The Composting Plant is to be designed, supplied and constructed by the CONTRACTOR so as to utilise the site to its best advantage, to provide for future increase in throughput of the plant, and to provide an environmentall acceptable form of development.

Data relating to the site is as follows:

{In this annexure the fullest information regarding the site shall be included under the following main sections:}

a - Precise location and available main highway access routes. A LOCATION MAP at a scale of not less than 1 in 25,000 shall be included.

b - Area of land available. A PLOT PLAN to a scale not less than 1 in 500 shall be included.

c - Site Characteristics.

d - Topography of adjacent land to site

f - Levels and Contours of site and immediate adjacent land.

g - Surface geology and detail of water-table

h - Road access.

i - Facilities for disposal of surface water run-off.

j.- Facailities for disposal of sewage from the plant.

k - Availability of water supply

1 - Potable water for drinking and sanitation.

2 - Process water for compost production.

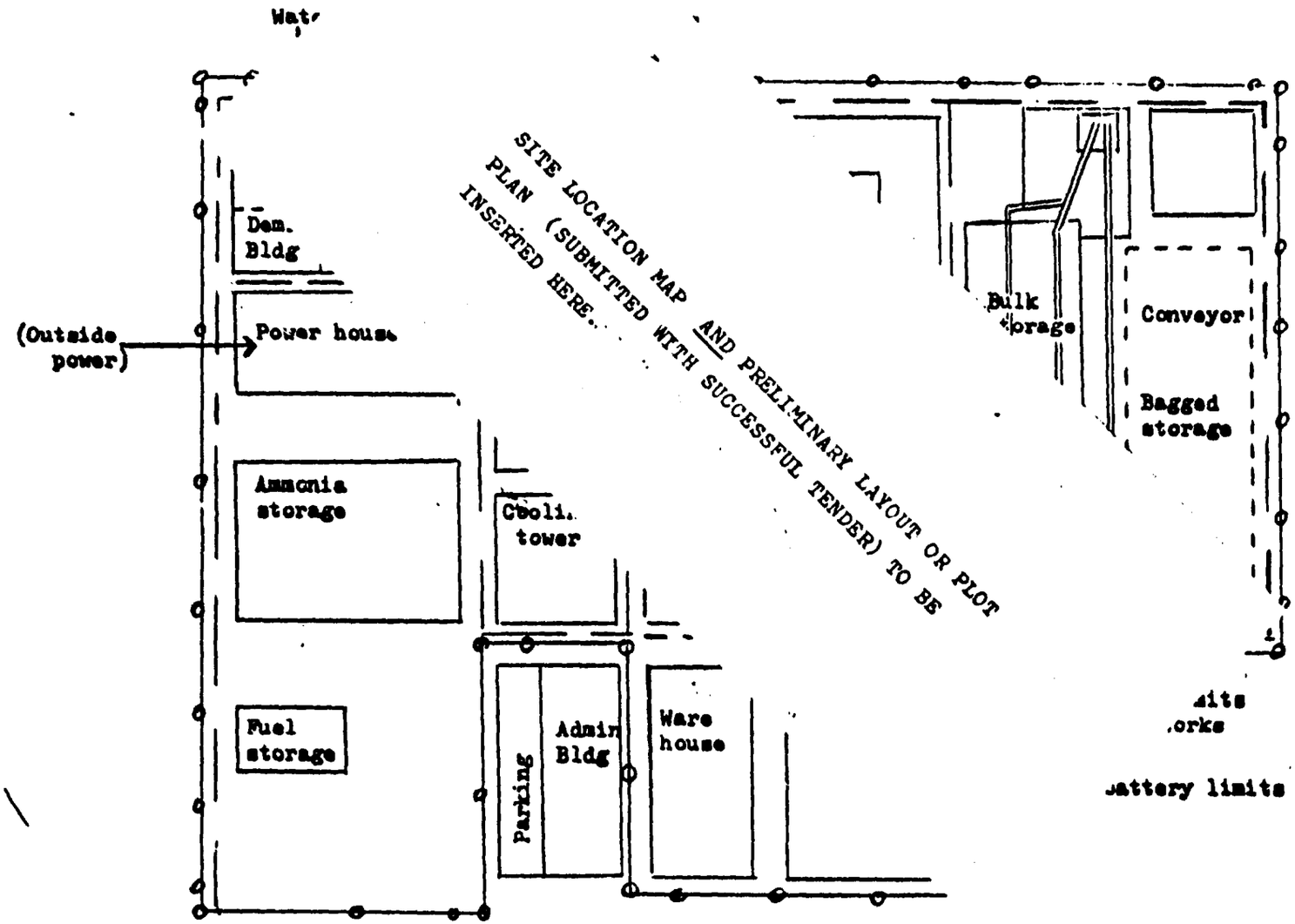
3.- Non-potable water for site cleaning and for fire fighting purposes.

l Ava ilability of Electric Power.

m Availability of Public Telephone Service.

n Special features of the site including any trees or other items which should be preserved.

TMINARY PLOT PLAN



SITE LOCATION MAP AND PRELIMINARY LAYOUT OR PLOT PLAN (SUBMITTED WITH SUCCESSFUL TENDER) TO BE INSERTED HERE.

ANNEXURE 1: Delete existing Text. Provide a New Title "Design Criteria employed by the Contractor"

INSERT New Text completed from the data supplied by the Contractor with his tender on the following Technical Data Sheet.

TECHNICAL DATA SHEET No 1
DESIGN CRITERIA EMPLOYED BY THE CONTRACTOR

---

1. **Refuse Composition** — Per Cent by weight

   a- Compostible Material
   b- Recoverable rejects (metal)
   c- Disposable Rejects

   d- Moisture Content

   e- Allowances made for seasonal variations.

2. **Refuse Density** — kg/cubic metre

   a- Density of feedstock

   b- Allowance made for seasonal variation

3. **Rated Throughput of Plant** — Shift of eight hours

	Tonnes	Cubic Metre
a- Complete Plant		
b- Each Flow Line		
c- Milling and Pre-Fermentation Plant		
d- Cleaning and Grading Plant		
e- Bagging Plant		

4. **Process Retention Periods**

   a- Moisture Adjustment
   b- Fermentation
   c- Maturation

5. **Processing Rejects**

	Tonnes	Cubic Metres
a- Milling and Pre-fermentation Treatment		
b - Primary Screening (if any)		
c- Cleaning and Grading		
d- Magnetic extraction of ferrous metal		

6. **Processing Densities** — kg/cubic metre

   a- After Milling /Primary Screening
   b- After Moisture Adjustment
   c- Start of Fermentation
   e- End of Fermentation
   f- End of Maturation
   g- After Cleaning and Grading

7. **Percentage yield of compost**

   a - The estimated yield of specification grade compost as a percentage of rated throughput.

8 **Temporary Storage of Feedstock**

   a- Volume and method of temporary storage of feedstock prior to processing ..... cubic metre.

9. Meterological

a- Maximum Ambient Temperature °C
b- Minimum Ambient Temperature °C
c- Maximum Rainfall Intensity mm in .....
d- Maximum Wind Velocity

10. Soil and Seismic Conditions

a- Load Bearing Capacity
b- Protection against sulphate action on concrete
c- Depth of water table below ground surface
d- Seismic factors (if any)

11. Process Water

a- Requirements (maximum) litres/hr
b- Maximu degree of salinity of water (if any)
c- Acceptable sources of process water.

12 Electricity Requirements

a- Total installed demand
b- Total absorbed power
c- Required Voltages and characteristics
i. High Tension ( ) V 3Phase, 3wire ( )Hz A.C.
ii. 3-Phase ( ) V 3phase,( )wire,( )Hz AC
iii. Single Phase ( ) V 1phase,( )wire,( )Hz AC

13 Standards, Codes of Practice and Regulations

A complete list of the Standards, Codes of Practice and Regulations used for the design of the machinery, plant equipment, electrical installation and civil works shall be given.

ANNEXURE V.

DOCUMENTS REQUIRING THE APPROVAL OF THE PURCHASER.

1. Technical documentation containing the following data shall require the approval of the PURCHASER

1.1. Technical Data Sheets

Technical Data Sheets are to be submitted at the time of tender and contain the information requested in the following Technical Data Sheets and prepared strictly in accordance with the tabulation of the items.

Technical Data Sheet No 1	Design Criteria employed by the Contractor
Technical Data Sheet No 2	Process Description, Supply of Equipment and Service Facilities
Techincal Data Sheet No 3	Time and Progress Schedule
Technical Data Sheet No 4	Personnel Training
Technical Data Sheet No 5	Rates Charges and Personnel Costs
Technical Data Sheet No 6	Civil Engineering Specification
Technical Data Sheets No 7	Guarantees of Throughput and Yield

1.2. Process

(a) Isometric Drawing to describe plant and method of operation.

(b) Process Flow Sheets with materials and mass balances

(c) Control and instrumentation diagrams

1.3. Equipment and machinery (fixed and mobile)

(a) Specifications and designed capacity

(b) List of recommended Vendors

(c) List of recommended soare parts

1.3. Layout

(a) General layout of the works

(b) Plot plan for the plant and for each flow-line

(c) Lay-out of machinery

(d) Layout of fermentation unit(with details of possible extensic

(e) Layout of Maturation Unit (with details of possible extension)

(f) Layout of Clearing Grading and Bagging Unit

(g) Layout of compost storage area.

1.4. Instrumentation

(a) General description of instrumentation and T.V.Monitoring

(b) General Description of control system and proposed types of instrumentation

(c) Description of alarms and interlocking systems

(d) Specification of control panels and desks

(e) Fire control system and alarms.

1.6. Electrical

(a) Electrical Power Balance and Motor List

(b) Single Line Electrical Diagram

(c) Plant Lighting proposals (internal and external)

1.7. Civil Engineering

(a) General Site Plan

(b) Details of Security Fencing and Gates

(c) Foundation layout with locations and diamensions.

(d) Layout of under-ground installations (sewerage, drainage, process water, sanitary water supply, electrical conduits, fire hydrants, etc)

(e) Layout of internal roads, parking areas, and surfaced processing areas.

(f) Preliminary profile drawings of the buildings with location of equipment, and details of foundation loading.

(g) Drawings showing areas where anti-corrosion protection of paved areas, floors and structures is necessary

(h) Location of maintenance access areas and apertures

2. As-built Documentation

(These documents do not require the Purchasers approval, but the Purchaser shall have the right to check them if desired)

(a) Complete civil engineering drawings for all buildings, including foundation, steelwork and all structural details.

(b) Complete machinery and equipment layout

(c) Complete control and instrumentation drawings

(d) Complete electrical layout and cable /fusing details

(e) Complete list of plant and equipment (including all mobile plant, with sizes and details of all technical parts, materials of construction and names and addresses of suppliers.

ANNEXURE VI - LIST OF TECHNICAL SERVICES TO BE PERFORMED BY THE CONTRACTOR

238 8 FOR Annexure XV read Annexure XI

THIS ANNEXURE TO BE COMPLETED AT THE GOVERNATES' DISCRETION

ANNEXURE VII - LIST OF SERVICES TO BE PROVIDED BY THE GOVERNATE

The serviices and obligations of the Governate of Damascus as the owner of the project are defined as follows:

a - To supply the necessary site for the composting plant,
b - To carry out the formalities relating to any necessary expropriation limited to the area necessary for the plant,
c - To provide road access to the site suitable for constructional traffic and vehicles,
d - To supply all necessary data about site topography, contours, soil type, soil bearing capacity and other relevant information.
e.- To provide an adequate electricity supply to the site,
f, - To provide a telephone service from site to city. (Contractor to pay all charges for calls)
g - To furnish all facilities necessary and act as intermediary with all Ministries, Customs and other Departments of the public sector, in order to enable Contractor to execute his respective contract within the scheduled period.
h - Subject to one months notice, secure entry visa for staff of the Contractor required for execution of the Contract.
i - To obtain Import Licence and pay the fees. Duties and Custom Fees for all the supplies of the Composting Plant are the Contractors Responsibility
j - To supply the necessary feedstock (municipal refuse) for the start up of the plant and for the performance guarantee trials.

ANNEXURE VIII DELETE existing Text. SUBSTITUTE new Text
New Text to be derived from the data supplied by the Contractor with his Tender on the following Technical Data Sheet

TECHNICAL DATA SHEET No 2

PROCESS DESCRIPTION, SUPPLY OF EQUIPMENT, AND SERVICE FACILITIES

NOTE: Much of the information reuired by this Technical Data Sheet will be the subject of discussion and agreement between the Contractor and Purchaser at the meetings specified in Article 6 of the Contract.

1. Process Description

1.1. A full process description shall be provided starting at the weighbridge and reception to the Plant and through the succesive stages to final distribution of the compost. It shall deal with the various stages in the following order:

a - Reception and temporary storage of feedstock prior to processing;
b - Method of feed to Processing Plant;
c - Pulverisation Milling Shredding or other size reduction;
d - Primary Screening (if any);
e - Moisture adjustment of feedstock;
f - Fermentation;
g - Maturation or curing;
h - Final Cleaning and Grading;
i - Disposal of processing rejects;
j - Disposal of recovered metals and other materials;
k - Distribution to users of final compost.

1.2. The items of plant, machinery and equipment shall be given the same distinguishing numbers in the process description as is contained a a flow-sheet which must form part of the submission.

1.3. The following information must be specifically included in the process description:

a - From reception of feedstock, the maximum time required by the process to produce specification grade compost

b - The estimated reliable yield of specification grade compost from each tonne of feedstock.

c - The estimated quantity of disposable rejects from the rated throughput of feedstock

d - The estimated quantity of marketable recovered materials (metal) from the rated throughput of feedstock.

e - The system of cleaning and grading the final compost to ensure it conforms to the specification contained in Annexure XXX

f - The recoomended personnel establishment for the plant.

g - Total power consumption of the full plant at the rated throughput of the feedstock.

h - The provision made in the des ign of the plant to facilitate any necessary extension of units to enable the plant to double its rated throughput by double shift operation of the treatment plant (Reception, feed, pulverisation, screening, mixing and moisture adjustment) This particularily applies to the Fermentation, Maturation and Compost Storage Units.

2. Plant Machinery and Equipment Layout and Interconnections

2.1. A layout of the complete composting plant including all ancilliary buildings and equipment shall be provided as drawings No...andNo....

2.2. A layout of the complete site including roads, parking areas, weighbridge, and paved and surfaced processing area, and showing all civil engineering works including windbreaks and landscaping of the site shall be provided as Drawings No.... and No .....

2.3. The control monitoring and instrumentation layout and system shall be indicated in Drawings No.... and No .....

2.4. A detailed equipment layout plan shall be provided as Drawing No .....

2.5. A one-line electrical diagram showing the electrical design to be submitted as Drawing No .....

2.6. Details of the internal supply and storage of process water shall be shown in Drawing No .....

2.7. Details of the control panels shall be submitted indicating their precise location.

2.8. A detailed drawing No .... shall be submitted showing the feedstock reception and storage arrangements, and also the method of feeding the processing plant

2.9 A detailed drawing shall be submitted No .... indicating the essential features of the Feedstock treatment plant (i.e. Pulveriser Mills, Screens Mixers and Moisture Adjustment System)

2.10 A detailed drawing showing the Fermentation Unit(No .....) This shall clearly indicate the method of aeration of the compost and any compost turning machinery

2.11. A Drawing No ..... showing the Maturation Unit and method of placing and withdrawing compost therefrom.

2.12. A drawing No .... showing the details of the Cleaning Grading and Bagging Unit.

3. Equipment List

3.1. A complete list of the machinery and equipment (fixed and mobile) to be supplied under the contract. The machinery and equipment will include all that is required within the Site Limits (Annexure III) and to produce the maximum quantity of specification grade compost from the rated throughput of feedstock, and to satisfy the guarantees contained in the Contract.

3.2. Each item of machinery and equipment shall be detailed as follows

a - Name of machine or equipment
b - Number on flow sheet
c - Size, capacity and other technical data.
d - Weight (where significant)
e - Material of construction
f - Safety devices to prevent access to moving parts
g - Means of access for maintenance
h - Specification of electric motors and drives.
i - Name and address of manufacturer.

4. Utilities

4.1. The services which are to be designed and supplied for the Composting Plant shall be listed and described, and any machinery or equipment for such services shall be detailed in the same manner as under 3.2. above.

4.2. The services include but are not necessarily comprehensive in scope:

a - Processing Water System
b - Sanitary Water System
c - Fire-fighting and alarm system
d - In-site sewage disposal system
e - In-site surface water drainage disposal
f - In-site telephone and tannoy system
g - Plant overload controls and emergency stop systems
h - Artificial lighting (internal and external)
i - T.V.Monitoring System
j (OPTIONAL EXTRA) Standby Electric Generator and switch over system (with costs)
k - Electrical power distribution system, lighting system, "wander" power outlets, earthing system (Motors shall be detailed under each item in the euipment, utitlity and ancilliary building sections)
l - Feedstock Moisture Adjustment System.
m - Dust Aspiration System for Reception Area and Storage Unit
n - Automatic Door system to Reception and Storage Unit.
O - Weighbridge Control and Ticketing System
p - Composting Plant Cleaning System

5. Ancilliary Buildings Etc

5.1. The Ancilliary Buildings that shall be provided for the Composting Plant include, but are not necessarily comprehensive in scope:

a - Administration Offices and Control Laboratory
b - Amenity Block (Messroom, Toilets, Laundry etc)
d - Weighbridge and Control Cabin
e - Workshop and stores
f - Gate House
g - Receptionand Storage Hangar
h - Processing Hall (pulveriser etc)
i - Fermentation Hangar
j - Cleaning and Grading Unit
k Site Garage for Mobile Equipment.

5.2. The equipment, furnishings, servicing plant tools and spares, laboratory equipment and chemicals, shall be listed and described.

5.3. The Site Security Fence and Gates shall be specified in detail.

5.4. Windbreaks and landscaping works shall be described.

6. Mobile Plant and Vehicles

6.1. The essential vehicles and plant required for handling and stacking compost at various stages of production, and for the disposal of rejects, and for the regular distribution of finished compost to users shall be be detailed in the same manner as under 3.2 above and be clearly classified as follows:

a - Mechanical Loading Shovels

b - Mobile Belt Conveyors

c - Compaction Type Bulk Refuse Transportation Vehicles (including suitable loading skips or containers)

d - Rough Terrain Dump Trucks

e - In-site servicing vehicles (i.e. Vans, Platform Trucks etc

f - Mobile Fire Pump Trailer

7. Environmental Protection and Safety Systems

7.1. Details shall be given of design measures and equipment proposed to effect environmental protection against:

a - Emmision of dust to atmosphere
b - Excessive noise and vibration
c - Emmision of noxious odours and smell
d - Pest infestation from flies, insects, scavenger birds rodents and domestic animals such as dogs and goats.

7.2. Details shall be given of design measures and equipment proposed to protect the health and safety of workpeople employed on or visiting the plant, and shall include:

a - Facilities to maintain the plant in a clean condition,
b - Protection against explosion within the plant
c - Description of ladders, walkways and safety equipment including emergency stopping devices for the plant and all machinery units, and covers and locking devices to prevent entry into any moving part.
d - Warning and information signs.
e - Dust Control and Fly Suppression within the Reception Storage Unit.
f - Air Conditioning of Cabs of Loading Shovels and vehicles working in extreme conditions.
g - Maintenance, Servicing , Lifting and Hoisting Equipment and details of suspension systems.

8. Miscellaneous

8.1. Details shall be given of the equipment to be provided for the recovering in a merchantable condition of metals and other materials from the feedstock. In particular the method of extraction of ferrous metals, the subsequent cleaning and removal of trash therefrom and the final baling of the metal shall be given in full detail.

8.2. Provision for the on-site storage of fuel oils for plant and vehicles shall be made to accommodate one months usage of fuel. Details of storage shall be given and also of Deisel Pumps for supply of fuel to the vehicles and plant.

8.3. Where Pulveriser Mills are included in the scheme details shall be submitted as follows:

a - The type of hammer employed and the current cost of a full set delivered to Damascus.
b - The average man-hours required to effect a change of hammers
c - The estimated quantity of feedstock throughput between a change of hammers.
d - The method adopted to prevent mechanical damage to the pulveriser mill from large foreign objects in the feedstock.

ANNEXURE IX This Annexure is not required and should be deleted

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ANNEXURE X - LIST OF SPARE PARTS

RENUMBER this Annexure "IX"

In Paragraph 1 Insertan additional sentence to read

"The Contract shall include for one years supply of spare parts, and a complete list of these shall be submitted with the Tender."

DELETE the whole of paragraph 3 and renumber subsequent paragraphs.

ANNEXURE XI This Annexure is not required and should be deleted

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ANNEXURE XII This Annexure is not required and should be deleted

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ANNEXURE XIII - EXCLUSIONS FROM SCOPE OF DELIVERY OF THE CONTRACTOR

RE-NUMBER this Annexure "X"

In Paragraph 2 DELETE the whole clause

In Paragraph 3 FOR "Battery Limits" in line 2 READ "the Site"

ANNEXURE XIV This Annexure is not required and should be deleted

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ANNEXURE XV — RENUMBER ANNEXURE XI - DELETE existing Text - SUBSTITUTE new Text derived from the data supplied by the Contractor with his tender on the following Technical Data Sheet

TECHNICAL DATA SHEET No 3

TIME SCHEDULE FOR IMPLEMENTING EACH STAGE OF THE CONTRACT AND DELIVERY OF DOCUMENTS

1. Time Schedule

1.1. The overall time schedule for completion of the work is to be shown in a BAR CHART to be attached herafter as part of ANNEXURE XV of the Contract Document. This BAR CHART to be based on the following considerations:

a - All dates and periods shall start with the EFFECTIVE DATE

b - The delivery FOB of equipment shall start and end by the dates indicated.

c - The transport of FOB Deliveries to Site to be indicated

d - The date of commencement of Civil Works shall be shown

e - The start of erectiion of mechanical plant shall be shown

f - The completion dates for civil, mechanical and electrical works shall be indicated

g - The date for INITIAL OPERATION of the Plant shall be shown

h - The date for the start of COMMERCIAL PRODUCTION shall be indicated.

2. Technical Documentation

2.1. The Technical D ocumentation described in AnnexureV shall be supplied by the CONTRACTOR to the PURCHASER and shall include all the documents necessary to enable the Purchaser to establish the source of the plants, machinery and equipment (fixed and mobile) and of spare parts. The technical documentation shall be in the ..... language.

2.2. The final supply of the various documents shall be made within the following specified periods starting from the effective date

	Period
2.2.1. Process Documentation	
a - Flow Sheets	
b - Control Diagrams	
c - Material Mass and Power Balances	
d - List and process Data Sheets for all equipment	
* e - Finalised list of operating personnel and their duties.	
2.2.2. Equipment and Machinery Documentation	
a - Detailed specifications of all equipment and machinery to be installed.	
b -Manufacturers Catalogues	
c - Manufactuerers Drawings	
d - Assembly drawings for machinery to be assembled on site	
* e - List of recommended spare parts	
f - Manufacturers Certificates and Documents concerning workshop testing and acceptence by authorised inspection in the manufactuers country	
g - Maintenance and lubrication Schedules	
2.2.3. Control and Monitoring Documentation	
* a - Detailed Diagrams	
b - Detailed Specifications and Manufacturers Literature and instructions.	

		Period
2.2.3.		
	c - Layout of control room	
	d - Specification of Control Panels	
	e - List and make of instruments	
	f - Data sheets for instruments	
	g - Cable List	
	h - Operation and Maintenace Instructions	
	i - List of protective fuses to all equipment and their specification and numbers	
	j - List of settings of switches, relays etc for operation of alarms, interlocks etc.	
2.2.4.	Electrical Documentation	
	a - Electric Power Balance	
	* b - Electric revised and final One-line Diagrams	
	c - Electric layout and cable routing	
	d - Electric equipment list and specifications	
	e - Operation and maintenance instructions	
	f - Final Plant Lighting System (internal and external) and list of equipment	
2.2.4.	Civil Engineering (drawings to be full civil engineering ones)	
	* a - Final Site Layout Plan	
	* b - Final Foundation Layout Plan	
	* c - Final underground installation plan (Trenches, pipes,cables, sewers, etc)	
	d - Final drawings for all buildings including location of machinery and equipment	
	e - Final details of special constructional elements (slopes, wet areas, anti-corrosion protection, maintenance access, etc)	
	f- Finalised Air-conditioning, ventilations and Dust-aspiration installation drawings	
	g - Detailed layout and constructional drawings for roads, parking areas, maturation, storages and other external processing areas, including surface water drainage, provision of windbreaks and final landscaping.	
	h - Final detailed drawings of Security fencing and gates	
	i - Final drawings for provision of weighbridge and control cabin, with traffic management plan for use of whole site.	
2.2.5.	General Documentation	
	a - Supply of complete set of As-built drawings	
	* b - All documents supplied by Process Licensors	
	* c - All operating Manuals including emergency instructions	
	* d - Detailed Code of Practice for the safe operation of the plant and the health and safety of the plant personnel	
	* e - Detailed Maintenance Instructions	
	f - Recommended List and general specifications of	
	1. Workshop equipment	
	2. Laboratory equipment	
	3 Fire fighting and safety equipment	
	4 Site Communications systems	
2.2.6.	Procurement Documentation	
	* a - Detailed List of Spare Parts	
	* b - List of Vendors for Spare Parts	
	* c - Procurement Documentation as Article 10	

2.3. Delivery procedure of documentation

The procedure for the delivery of documentation supplied by the CONTRACTOR shall be as follows:

2.3.1. The documentation shall be despatched to the PURCHASER by air-way bill on a freight pre-paid basis, and the PURCHASER shall acknowledge each despatch immediately after receiving it. The date of delivery shall be the actual date of of the air-way bill.

2.3.2. The documentation shall be supplied in SIX copies and one reproducible copy (with the exclusion of the catalogues, pamphlets and manuals supplied by Sub-Contractors)

2.4. The items oftechnical documentation marked • are the documents liable to liquidated damages persuant to Article 27 of the Contract.

2.5. The approval of the PURCHASER shall be obtained for documents included herein but specified in Annexure V.

ANNEXURE XVI - QUALITY OF PRODUCTS RE-NUMBER Annexure XII"

DELETE the whole of existing Text and SUBSTITUTE the following:

ANNEXURE XII

QUALITY OF PRODUCTS FROM PLANT

1. Specification Grade Compost

The compost produced by the Composting Plant MUST satisfy the following requirements:

a - During the process of fermentation the feedstock must be throughly pasteurised by being subjected to a self generated temperature of not less than 60°C for a continuous period of not less than four full days (96hours).

b - The compost must be fully mature and stabilised at completion so that it is unable to cause damage to soils or to crops. It must therefore be free from noxious smell and its temperature before removal from the maturation unit must not exceed 40°C, and its temperature must not show any increase when the material is subject to further fermentation tests under optimum conditions.

c - Its granulometry shall be such that 90 per cent by weight of compost as removed from maturation unit will pass through a 40mm square mesh seive. The oversized material is to be re-processed through the plant.

d After Cleaning and refining the compost shall

i - Be free from hard particles and foreign matter of a size which is retained on a 10mm square mesh seive.

ii - Be free from visually detectable glass or ceramic splinters and any particles of such material of a size which will be retained on a 1.5mm square mesh seive.

e. The moisture content of compost before being distributed to users shall not exceed 35 per cent by weight.

f The Nitrogen content must not be less than 0.5 per cent of dry matter by weight.

g The Carbon to Nitrogen Ration(C/N) shall not exceed 24 at any time, but the general acceptable average value will be 20.

h The Ph Value shall not be less than 7 and not greater than 8.

i. The level of salinity (sodium chloride) shall not exceed that of the average value for soils in the Damscus area.

j. It shall not contain pathogenic germs or viable plant seeds.

l. The compost shall be graded into two qualities by size:

Medium Compost - Passing a 20mm square mesh seive
Coarse Compost - Passing a 40mm square mesh seive but retained on a 20mm square mesh seive

2. Merchantable Rejects

Any recovered materials from the feedstock shall be sufficiently clean to have a commercial sale value. This particularily applies to recovered metal.

ANNEXURE XVII This Annexure is not required and should be deleted

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ANNEXURE XVIII RE-NUMBER XIII

Paragraph 3 Alter Article Numbers in line 3 to READ

"Article 4.30; Article 16 and Article 20.7"

SUBSTITUTE the entries under the headings:

Designation	Number	Time	Training Units

(Derived from data supplied by the Contractor with his Tender from the following data sheet)

TECHNICAL DATA SHEET No 4

TRAINING OF THE PURCHASER'S PERSONNEL

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1. Staffing Requirements

1.1. The Contractor shall specify the staffing requirements for the composting plant in respect of

a - Management
b - Technical Operation and supervision
c - Skilled operatives
d - Unskilled workmen.
e - Maintenance.

1.2. He shall list the staff requirements according to various categories and functions.

2. Training of Personnel

2.1. The Contractor shall schedule the personnel for which training will be necessary and the extent to which overseas training is desirable.

2.2. The Schedule shall contain the following information:

a - Staff Designation of Trainees (each trainee to be itemised)

b - Training Period for each Trainee

c - Subjects for training of each trainee and where training is to be obtained.

ANNEXURE XIX — RE-NUMBER XIV - PROCEDURE FOR VARIATIONS ETC

No alteration is required to this Text.

ANNEXURE XX — This Annexure is not required and should be deleted

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ANNEXURE XXI — RE - NUMBER XV MANUALS

Para 1(a) FOR "ammonia and urea plants" READ " Composting Plant"

Para 1 (b) After "pumps" in Line 2 INSERT "pulverisers, mills, mixers, conveyors, screens, air classifiers, ballistic seperators, magnetic seperators, dust aspiration plant, bagging plant"

Para 1(d) After the word Plant in line 2 DELETE the words "monitoring the effluents and emmisions"

Para 1(g) DELETE the whole sub-clause.

ANNEXURE XXII — RE-NUMBER XVI PERFORMANCE GUARANTEE & BONDS

NOTE: This Annexure should be carefully checked and amended as desired by the Governate

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ANNEXURE XXIII — RE-NUMBER XVII BANK GUARANTEES

NOTE: This Annexure should be carefully checked and amended as desired by the Governate.

SEE: CORRIGENDUM WITH OFFICIAL MODEL FORM OF CONTRACT

ANNEXURE XXIV — RE-NUMBER XVIII PACKING AND SHIPPING

Para 5(b) For "Annexure XXIII" Read" Annexure XVII"

ANNEXURE XXV — RE-NUMBER XIX RECEIPT & STORAGE AT SITE

Para 1(ii) DELETE the words "and near rail sidings"

Para 1(iii) INSERT "20" before the word "centimetres"

Para 1 (vi) DELETE all words after "materials"

Para 2(v) Delete in 1st line the words "(viz boiler/reactors etc)

ANNEXURE XXVI — RE-NUMBER XX PROCUREMENT PROCEDURES

DELETE the whole of paragraph 2

ANNEXURE XXVII

RE-NUMBER XXI RATES CHARGES & SERVICES

Complete the Annexure with data derived from that supplied by the Contractor with his Tende Or Technical Data Sheet No 5

TECHNICAL DAT SHEET No 5

RATES, CHARGES AND PERSONNEL SERVICES

For completion of the Annexure to the Contract the following data to be supplied

1. Contractors Home Office Charges on a cost-plus basis

1.1. Direct cost of personnel

Designation	Cost per hour
.....	.....
.....	.....

1.2. Overheads and Profits

Perecentage increase over direct costs .....%

2. Contractors Expatriate Personnel Charges

2.1. For each day of absence from Home Office

Personnel	Rates per day
.....	.....
.....	.....

3 Overtime Charges

Up to 54 hours/week	.....% of normal rates
Above 54 hours/week	.....% of normal rates
Weekly and public holidays	.....% of normal rates

4. Local Allowance for Expatriate Personnel

Personnel	Rate per day of presence on site
.....	.....
.....	.....

ANNEXURE XXVIII

RE-NUMBER XXII

Para 1 Line 1 DELETE"(e.g. Urea Storage)"
Line 4 DELETE whole line reading "railway sidings"

Para 2.3. DELETE whole of sub-clause

NOTE: This annexure to be fully completed from the data contained in the Technical Data Sheet No 6 and supplied by the Contractor with his tender.

TECHNICAL DATA SHEET No 6

CIVIL ENGINEERING SPECIFICATIONS

The following data to be provided by the Contractor:

1. List of Civil Engineering Works

This to be complete and indexed in relation to a layout plan

2. General Specifications

2.1. Buildings Each building to be detailed as follows
a Dimensions
b Location of floors and sub-floors
c Details of foundations, structure, walls and cladding, roof, doors and windows, flooring, fittings, services, air-conditioning, etc
d Line drawings of the buildings

2.2. Roads and Paved Areas

a Level and slope
b Type of earthwork
c Dimensions
d Construction,(sub-base - base - surface - drainage)
e Layout drawing

2.3 Machinery Foundations

a - Full details including load bearing conditions

2.4. Underground works (cables, drainage, water supply etc)

a - Layout drawings
b - Details of construction
c - Sanitary drainage and sewage disposal
e - Weighbridge

2.5. Miscellaneous

a - Security Fencing and gates
b - Windbreaks and landscaping
c - External artificial lighting
d - Traffic Management
e - Painting and decoration schedule

3. Design Codes, Material Specifications and Civil Engineering Standards

These to be detailed, preferably in a separate volume of specifications and standards, and should follow generally recognised international standards and codes of practice.

ANNEXURE XXIX — This Annexure is not required and should be deleted

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ANNEXURE XXX — RE-NUMBER XXIII

Re-TITLE as follows

"GUARANTEES OF THROUGHPUT OF FEEDSTOCK AND PRODUCTION YIELD OF COMPOST ETC "

DELETE the whole of the text of this Annexure and SUBSTITUTE a new Annexure Text derived from the data supplied by the Contractor with his TENDER on Technical Data Sheet No 7

TECHNICAL DATA SHEET No 7

GUARANTEES OF THROUGHPUT OF FEEDSTOCK AND PRODUCTION YIELD OF COMPOST ETC

NOTE:

1. The time required for the feedstock to pass the various stages of the composting process varies widely
2. RATED THROUGHPUT of a COMPOSTING PLANT means the quantity of feedstock which can be consistently fed and processed in ONE EIGHT WORKING SHIFT, through the pulverisation/size reduction/ pre-fermentatation stage.
2. The YIELD OF SPECIFICATION GRADE COMPOST is calculated as a percentage of the Rated Throughput of the Feedstock.

The Contractor must specify :

1 Rated Throughput of Composting Plant	FULL PLANT		EACH FLOW-LINE	
	Tonnes	Cubic Metre	Tonnes	Cubic M
The plant will consistently receive, feed and process in ONE EIGHT WORKING SHIFT ----------	.....	.....	.....	.....

The specified Rated Throughput to be:

700 tonnes (2400 cubic metres UNSORTED unicipal Refuse

AND

300 tonnes (400 cubic metres) Semi-dry Sewage Sludge (66.6.% moisture w/w)

It is acknowledeged that provision has been made to add liquid sewage sludge (97% moisture w/w) in sufficient quantity to adjust the moisture level of the feedstock prior to fermentation to 55% w/w.

(continued on next page)

2. Processing Rejects

The estimated amount of rejects as a percentage of the rated throughput are:

Primary Milling and Screening	.....%
Final Cleaning and Grading	.....%
Recovered Materials (Metals)	.....%
Other Rejects (if any)	.....%

3. Composting Loss

It is estimated that the processing loss during composting will be ..... per cent of the rated throughput.

4. Duration of Composting Stages

a -	From Reception to completion	..... days
b -	Fermentation Stage	..... days
c -	Maturation Stage	..... days

5. Yield of Specification Grade Compost.

The estimated reliable yield of specification grade compost will be ..... per cent of the rated throughput of feedstock.

6. Total Electric Absorbed Power

The total power requirements of the composting plant in one eight hour working shift and operating at the maximum rated throughput will be .....

7. Environmental Protection

The Composting Plant is designed to operate without predjudice to Public Health arising from excessive noise, vibration, dust emmision, smell and or pest infestation.

8. Defects in Works

Article 28 of the Contract specifies the full warranties to be provided in this respect. In Article 28.7 however the period in respect of Civil Works shall be ten years.

ANNEXURE XXXI RE-NUMBER XXIV Guarntee Test Procedures

Para	Line.	
1	1	DELETE "consumption of raw materials and" and SUBSTITUTE "throughput of fieedstock, yield of compost, and consumption of"
1.	3	FOR "Ammonia" READ "Composting"
1.	3/4	DELETE all the wrods following "Plant"
31.	1	FOR (10) READ "six" FOR "Ammonia and Urea" READ "Composting"
3.1.	2	AFTER the word "Plant" INSERT " and shall be follwed successively by the three day tests and the eight hour test"
4	1	FOR "Ammonia and Urea Plants" READ "Composting Plant"
	2	FOR (20) READ "six"
	3	FOR (10) READ "six"

DELETE Sub-clauses 4.1. to 4.4. inclusive

5. - DELETE Paragrapghs 5 and 5.1. and SUBSTITUTE

" The six day 100 per cent capacity test on the FULL Plant . shall be immediately followed by a six-day 100 per cent capacity test on EACH SEPERATE Flow-line (or each 50% of the plant if more than two flow lines) as detailed in Article 26.4.1.2.; and these tests shall in turn be immediately followed by the eight hour 110 per cent capacity test on the full plant".

6 - DELETE the whole of the text of Paragraphs 6; 6.1. and 6.2. and SUBSTITUTE

" The tests shall not only demonstrate the adequacy of the plant and each flow-line, in terms of rated throughput of feedstock, and yield of specification grade compost, it shall also demonstrate the efficiency of fermentation, maturation, cleaning and bagging, power and water demand, the percentage of usable and un-usable rejects, and the adequacy of all ancilliary equipment and vehicles.
The Feedstock which is processed in the various Tests shall be kept seperate for full fermentation , full maturation and final cleaning and grading"

7. 1/2 DELETE the words "including the calibration of instruments"

8 1 INSERT after the word "instruments" the words "and measuring and weighing equipment"
DELETE the remainder of this paragraph after the first sentence.

9 - DELETE the whole text and SUBSTITUTE " The processed feedstock from each test shall have samples withdrawn at the completion of the FERMENTATION stage, the MATURATION stage and after CLEANING AND GRADING.
These samples shall be subject to careful analysis to determine compliance with the product specification in Annexure XII"

ANNEXURE XXX1 (continued) RE-NUMBERED XXIV

Add ADDITIONAL PARAGRAPH

11. "In the event that a sufficient quantity of feedstock is not being delivered daily to the plant in sufficient amount to enable the tests to be carried out without interuption, local arrangements shall be made by the Purchaser and the Contractor to accumulate and temporarily store on site sufficient feedstock. The feedstock shall only be stored for a time to enable the tests to be properly conducted, and care shall be exercised that the storage time and conditions do not materially alter the condition of the feedstock, in comparison with the nature of the feedstock at the time of delivery"

ANNEXURE XXXII RE-NUMBER XXV ARBITRATION TERMS & RULES

NOTE: This Annexure requires completion to meet the practice of the Government and the Governate.

SCHEDULE No 2

REVISED ANNEX VIII OF UNIDO MODEL FORM OF CONTRACT

CONTRACT TECHNICAL DATA SHEETS

These sheets specify the information which Contractors are requested to submit with their tenders. This information will subsequently be incorporated into annexures to the Contract Document.

It is important that the the information in respect of each item be submitted strictly in the order shown in the Technical Data Sheets.

ANNEXURE IV

TECHNICAL DATA SHEET No 1

DESIGN CRITERIA EMPLOYED BY THE CONTRACTOR

---

1. Refuse Composition — Per Cent by weight

   a- Compostible Material
   b- Recoverable rejects (metal)
   c- Disposable Rejects

   d- Moisture Content

   e- Allowances made for seasonal variations.

2. Refuse Density — kg/cubic metre

   a- Density of feedstock

   b- Allowance made for seasonal variation

3. Rated Throughput of Plant — Shift of eight hours

	Tonnes	Cubic Metre
a- Complete Plant		
b- Each Flow Line		
c- Milling and Pre-Fermentation Plant		
d- Cleaning and Grading Plant		
e- Bagging Plant		

4. Process Retention Periods

   a- Moisture Adjustment
   b- Fermentation
   c- Maturation

	Tonnes	Cubic Metres

5. Processing Rejects

   a- Milling and Pre-fermentation Treatment
   b - Primary Screening (if any)
   c- Cleaning and Grading
   d- Magnetic extraction of ferrous metal

6. Processing Densities — kg/cubic metre

   a- After Milling /Primary Screening
   b- After Moisture Adjustment
   c- Start of Fermentation
   e- End of Fermentation
   f- End of Maturation
   g- After Cleaning and Grading

7. Percentage yield of compost

   a - The estimated yield of specification grade compost as a percentage of rated throughput.

8. Temporary Storage of Feedstock

   a- Volume and method of temporary storage of feedstock prior to processing ..... cubic metre

9. Meterological

a- Maximum Ambient Temperature ^{o}C
b- Minimum Ambient Temperature ^{o}C
c- Maximum Rainfall Intensity mm in .....
d- Maximum Wind Velocity

10. Soil and Seismic Conditions

a- Load Bearing Capacity
b- Protection against sulphate action on concrete
c- Depth of water table below ground surface
d- Seismic factors (if any)

11. Process Water

a- Requirements (maximum) litres/hr
b- Maximu degree of salinity of water (if any)
c- Acceptable sources of process water.

12 Electricity Requirements

a- Total installed demand
b- Total absorbed power
c- Required Voltages and characteristics
i. High Tension ( ) V 3Phase, 3wire ( )Hz A.C.
ii. 3-Phase ( ) V 3phase,( )wire,( )Hz AC
iii. Single Phase ( ) V 1phase,( )wire,( )Hz AC

13 Standards, Codes of Practice and Regulations

A complete list of the Standards, Codes of Practice and Regulations used for the design of the machinery, plant equipment, electrical installation and civil works shall be given.

PROCESS DESCRIPTION, SUPPLY OF EQUIPMENT, AND SERVICE FACILITIES

NOTE: Much of the information reuired by this Technical Data Sheet will be the subject of discussion and agreement between the Contractor and Purchaser at the meetings specified in Article 6 of the Contract.

1. Process Description

1.1. A full process description shall be provided starting at the weighbridge and reception to the Plant and through the succesive stages to final distribution of the compost. It shall deal with the various stages in the following order:

a - Reception and temporary storage of feedstock prior to processing;
b - Method of feed to Processing Plant;
c - Pulverisation Milling Shreading or other size reduction;
d - Primary Screening (if any);
e - Moisture adjustment of feedstock;
f - Fermentation;
g - Maturation or curing;
h - Final Cleaning and Grading;
i - Disposal of processing rejects;
j - Disposal of recovered metals and other materials;
k - Distribution to users of final compost.

1.2. The items of plant, machinery and equipment shall be given the same distinguishing numbers in the process description as is contained a a flow-sheet which must form part of the submission.

1.3. The following information must be specifically included in the process description:

a - From reception of feedstock, the maximum time required by the process to produce specification grade compost

b - The estimated reliable yield of specification grade compost from each tonne of feedstock.

c - The estimated quantity of disposable rejects from the rated throughput of feedstock

d - The estimated quantity of marketable recovered materials (metal) from the rated throughput of feedstock.

e - The system of cleaning and grading the final compost to ensure it conforms to the specification contained in Annexure XXX

f - The recoomended personnel establishment for the plant.

g - Total power consumption of the full plant at the rated throughput of the feedstock.

h - The provision made in the design of the plant to facilitate any necessary extension of units to enable the plant to double its rated throughput by double shift operation of the treatment plant (Reception, feed, pulverisation, screening, mixing and moisture adjustment) This particularily applies to the Fermentation, Maturation and Compost Storage Units.

2. Plant Machinery and Equipment Layout and Interconnections

2.1. A layout of the complete composting plant including all ancilliary buildings and equipment shall be provided as drawings No...andNo....

2.2. A layout of the complete site including roads, parking areas, weighbridge, and paved and surfaced processing area, and showing all civil engineering works including windbreaks and landscaping of the site shall be provided as Drawings No.... and No .....

2.3. The control monitoring and instrumentation layout and system shall be indicated in Drawings No.... and No .....

2.4. A detailed equipment layout plan shall be provided as Drawing No .....

2.5. A one-line electrical diagram showing the electrical design to be submitted as Drawing No .....

2.6. Details of the internal supply and storage of process water shall be shown in Drawing No .....

2.7. Details of the control panels shall be submitted indicating their precise location.

2.8. A detailed drawing No .... shall be submitted showing the feedstock reception and storage arrangements, and also the method of feeding the processing plant

2.9 A detailed drawing shall be submitted No .... indicating the essential features of the Feedstock treatment plant (i.e. Pulveriser Mills, Screens Mixers and Moisture Adjustment System)

2.10 A detailed drawing showing the Fermentation Unit(No .....) This shall clearly indicate the method of aeration of the compost and any compost turning machinery

2.11. A Drawing No ..... showing the Maturation Unit and method of placing and withdrawing compost therefrom.

2.12. A drawing No .... showing the details of the Cleaning Grading and Bagging Unit.

3. Equipment List

3.1. A complete list of the machinery and equipment (fixed and mobile) to be supplied under the contract. The machinery and equipment will include all that is required within the Site Limits (Annexure III) and to produce the maximum quantity of specification grade compost from the rated throughput of feedstock, and to satisfy the guarantees contained in the Contract.

3.2. Each item of machinery and equipment shall be detailed as follows

a - Name of machine or equipment
b - Number on flow sheet
c - Size, capacity and other technical data.
d - Weight (where significant)
e - Material of construction
f - Safety devices to prevent access to moving parts
g - Means of access for maintenance
h - Specification of electric motors and drives.
i - Name and address of manufacturer.

4. Utilities

4.1. The services which are to be designed and supplied for the Composting Plant shall be listed and described, and any machinery or equipment for such services shall be detailed in the same manner as under 3.2. above.

4.2. The services include but are not necessarily comprehensive in scope:

a - Processing Water System
b - Sanitary Water System
c - Fire-fighting and alarm system
d - In-site sewage disposal system
e - In-site surface water drainage disposal
f - In-site telephone and tannoy system
g - Plant overload controls and emergency stop systems
h - Artificial lighting (internal and external)
i - T.V.Monitoring System
j (OPTIONAL EXTRA) Standby Electric Generator and switch over system (with costs)
k - Electrical power distribution system, lighting system, "wander" power outlets, earthing system (Motors shall be detailed under each item in the euipment, utitlity and ancilliary building sections)
l - Feedstock Moisture Adjustment System.
m - Dust Aspiration System for Reception Area and Storage Unit
n - Automatic Door system to Reception and Storage Unit.
O - Weighbridge Control and Ticketing System
p - Composting Plant Cleaning System

5. Ancilliary Buildings Etc

5.1. The Ancilliary Buildings that shall be provided for the Composting Plant include, but are not necessarily comprehensive in scope:

a - Administration Offices and Control Laboratory
b - Amenity Block (Messroom, Toilets, Laundry etc)
d - Weighbridge and Control Cabin
e - Workshop and stores
f - Gate House
g - Receptionand Storage Hangar
h - Processing Hall (pulveriser etc)
i - Fermentation Hangar
j - Cleaning and Grading Unit
k Site Garage for Mobile Equipment.

5.2. The equipment, furnishings, servicing plant tools and spares, laboratory equipment and chemicals, shall be listed and described.

5.3. The Site Security Fence and Gates shall be specified in detail.

5.4. Windbreaks and landscaping works shall be described.

6. Mobile Plant and Vehicles

6.1. The essential vehicles and plant required for handling and stacking compost at various stages of production, and for the disposal of rejects, and for the regular distribution of finished compost to users shall be be detailed in the same manner as under 3.2 above and be clearly classified as follows:

a - Mechanical Loading Shovels

b - Mobile Belt Conveyors

c - Compaction Type Bulk Refuse Transportation Vehicles (including suitable loading skips or containers)

d - Rough Terrain Dump Trucks

e - In-site servicing vehicles (i.e. Vans, Platform Trucks etc)

f - Mobile Fire Pump Trailer

7. Environmental Protection and Safety Systems

7.1. Details shall be given of design measures and equipment proposed to effect environmental protection against:

a - Emmision of dust to atmosphere
b - Excessive noise and vibration
c - Emmision of noxious odours and smell
d - Pest infestation from flies, insects, scavenger birds rodents and domestic animals such as dogs and goats.

7.2. Details shall be given of design measures and equipment proposed to protect the health and safety of workpeople employed on or visiting the plant, and shall include:

a - Facilities to maintain the plant in a clean condition,
b - Protection against explosion within the plant
c - Description of ladders, walkways and safety equipment including emergency stopping devices for the plant and all machinery units, and covers and locking devices to prevent entry into any moving part.
d - Warning and information signs.
e - Dust Control and Fly Suppression within the Reception Storage Unit.
f - Air Conditioning of Cabs of Loading Shovels and vehicles working in extreme conditions.
g - Maintenance, Servicing , Lifting and Hoisting Equipment and details of suspension systems.

8. Miscellaneous

8.1. Details shall be given of the equipment to be provided for the recovering in a merchantable condition of metals and other materials from the feedstock. In particular the method of extraction of ferrous metals, the subsequent cleaning and removal of trash therefrom and the final baling of the metal shall be given in full detail.

8.2. Provision for the on-site storage of fuel oils for plant and vehicles shall be made to accommodate one months usage of fuel. Details of storage shall be given and also of Deisel Pumps for supply of fuel to the vehicles and plant.

8.3. Where Pulveriser Mills are included in the scheme details shall be submitted as follows:

a - The type of hammer employed and the current cost of a full set delivered to Damascus.
b - The average man-hours required to effect a change of hammer
c - The estimated quantity of feedstock throughput between a change of hammers.
d - The method adopted to prevent mechanical damage to the pulveriser mill from large foreign objects in the feedstock.

TIME SCHEDULE FOR IMPLEMENTING EACH STAGE
OF THE CONTRACT AND DELIVERY OF DOCUMENTS

1. Time Schedule

1.1. The overall time schedule for completion of the work is to be shown in a BAR CHART to be attached herafter as part of ANNEXURE XV of the Contract Document. This BAR CHART to be based on the following considerations:

a - All dates and periods shall start with the EFFECTIVE DATE

b - The delivery FOB of equipment shall start and end by the dates indicated.

c - The transport of FOB Deliveries to Site to be indicated

d - The date of commencement of Civil Works shall be shown

e - The start of erectiion of mechanical plant shall be shown

f - The completion dates for civil, mechanical and electrical works shall be indicated

g - The date for INITIAL OPERATION of the Plant shall be shown

h - The date for the start of COMMERCIAL PRODUCTION shall be indicated.

2. Technical Documentation

2.1. The Technical D ocumentation described in AnnexureV shall be supplied by the CONTRACTOR to the PURCHASER and shall include all the documents necessary to enable the Purchaser to establish the source of the plants, machinery and equipment (fixed and mobile) and of spare parts. The technical documentation shall be in the ..... language.

2.2. The final supply of the various documents shall be made within the following specified periods starting from the effective date

2.2.1. Process Documentation — Period

a - Flow Sheets
b - Control Diagrams
c - Material Mass and Power Balances
d - List and process Data Sheets for all equipment
*e - Finalised list of operating personnel and their duties.

2.2.2. Equipment and Machinery Documentation

a - Detailed specifications of all equipment and machinery to be installed.
b -Manufacturers Catalogues
c - Manufactuerers Drawings
d - Assembly drawings for machinery to be assembled on site
*e - List of recommended spare parts
f - Manufacturers Certificates and Documents concerning workshop testing and acceptence by authorised inspection in the manufactuers country
g - Maintenance and lubrication Schedules

2.2.3. Control and Monitoring Documentation

*a - Detailed Diagrams
b - Detailed Specifications and Manufacturers Literature and instructions.

2.2.3. **Period**

c - Layout of control room
d - Specification of Control Panels
e - List and make of instruments
f - Data sheets for instruments
g - Cable List
h - Operation and Maintenace Instructions
i - List of protective fuses to all equipment and their specification and numbers
j - List of settings of switches, relays etc for operation of alarms, interlocks etc.

2.2.4. Electrical Documentation

a - Electric Power Balance
* b - Electric revised and final One-line Diagrams
c - Electric layout and cable routing
d - Electric equipment list and specifications
e - Operation and maintenance instructions
f - Final Plant Lighting System (internal and external) and list of equipment

2.2.4. Civil Engineering (drawings to be full civil engineering ones)

* a - Final Site Layout Plan
* b - Final Foundation Layout Plan
* c - Final underground installation plan (Trenches, pipes, cables, sewers, etc)
d - Final drawings for all buildings including location of machinery and equipment
e - Final details of special constructional elements (slopes, wet areas, anti-corrosion protection, maintenance access, etc)
f- Finalised Air-conditioning, ventilations and Dust-aspiration installation drawings
g - Detailed layout and constructional drawings for roads, parking areas, maturation, storages and other external processing areas, including surface water drainage, provision of windbreaks and final landscaping.
h - Final detailed drawings of Security fencing and gates
i - Final drawings for provision of weighbridge and control cabin, with traffic management plan for use of whole site.

2.2.5. General Documentation

a - Supply of complete set of As-built drawings
* b - All documents supplied by Process Licensors
* c - All operating Manuals including emergency instructions
* d - Detailed Code of Practice for the safe operation of the plant and the health and safety of the plant personnel
* e - Detailed Maintenance Instructions
f - Recommended List and general specifications of
1. Workshop equipment
2. Laboratory equipment
3 Fire fighting and safety equipment
4 Site Communications systems

2.2.6. Procurement Documentation

* a - Detailed List of Spare Parts
* b - List of Vendors for Spare Parts
* c - Procurement Documentation as Article 10

2.3. Delivery procedure of documentation

The procedure for the delivery of documentation supplied by the CONTRACTOR shall be as follows:

2.3.1. The documentation shall be despatched to the PURCHASER by air-way bill on a freight pre-paid basis, and the PURCHASER shall acknowledge each despatch immediately after receiving it. The date of delivery shall be the actual date of of the air-way bill.

2.3.2. The documentation shall be supplied in SIX copies and one reproducible copy (with the exclusion of the catalogues, pamphlets and manuals supplied by Sub-Contractors)

2.4. The items oftechnical documentation marked • are the documents liable to liquidated damages pursuant to Article 27 of the Contract.

2.5. The approval of the PURCHASER shall be obtained for documents included herein but specified in Annexure V.

ANNEXURE XIII

TECHNICAL DATA SHEET NO 4

TRAINING OF THE PURCHASER'S PERSONNEL

1. Staffing Requirements

1.1. The Contractor shall specify the staffing requirements for the composting plant in respect of

a - Management
b - Technical Operation and supervision
c - Skilled operatives
d - Unskilled workmen.
e - Maintenance.

1.2. He shall list the staff requirements according tc various categories and functions.

2. Training of Personnel

2.1. The Contractor shall schedule the personnel for which training will be necessary and the extent to which overseas training is desirable.

2.2. The Schedule shall contain the following information:

a - Staff Designation of Trainees (each trainee to be itemised)

b - Training Period for each Trainee

c - Subjects for training of each trainee and where training is to be obtained.

ANNEXURE XXI

TECHNICAL DATA SHEET No 5.

RATES, CHARGES AND PERSONNEL SERVICES

For completion of the Annexure to the Contract the following data to be supplied

1. Contractors Home Office Charges on a cost-plus basis

1.1. Direct cost of personnel

Designation	Cost per hour
.....	.....
.....	.....

1.2. Overheads and Profits

Perecentage increase over direct costs .....%

2. Contractors Expatriate Personnel Charges

2.1. For each day of absence from Home Office

Personnel	Rates per day
.....	.....
.....	.....

3 Overtime Charges

Up to 54 hours/week	.....% of normal rates
Above 54 hours/week	.....% of normal rates
Weekly and public holidays	.....% of normal rates

4. Local Allowance for Expatriate Personnel

Personnel	Rate per day of presence on site
.....	.....
.....	.....

CIVIL ENGINEERING SPECIFICATIONS

The following data to be provided by the Contractor:

1. List of Civil Engineering Works

This to be complete and indexed in relation to a layout plan

2. General Specifications

2.1. Buildings Each building to be detailed as follows

a Dimensions
b Location of floors and sub-floors
c Details of foundations, structure, walls and cladding, roof, doors and windows, flooring, fittings, services, air-conditioning, etc
d Line drawings of the buildings

2.2. Roads and Paved Areas

a Level and slope
b Type of earthwork
c Dimensions
d Construction,(sub-base - base - surface - drainage)
e Layout drawing

2.3 Machinery Foundations

a - Full details including load bearing conditions

2.4. Underground works (cables, drainage, water supply etc)

a - Layout drawings
b - Details of construction
c - Sanitary drainage and sewage disposal
e - Weighbridge

2.5. Miscellaneous

a - Security Fencing and gates
b - Windbreaks and landscaping
c - External artificial lighting
d - Traffic Management
e - Painting and decoration schedule

3. Design Codes, Material Specifications and Civil Engineering Standards

These to be detailed, preferably in a separate volume of specifications and standards, and should follow generally recognised international standards and codes of practice.

ANNEXURE XXIII

TECHNICAL DATA SHEET No 7

GUARANTEES OF THROUGHPUT OF FEEDSTOCK
AND PRODUCTION YIELD OF COMPOST ETC

NOTE:
1. The time required for the feedstock to pass the various stages of the composting process varies widely
2. RATED THROUGHPUT of a COMPOSTING PLANT means the quantity of feedstock which can be consistently fed and processed in ONE EIGHT WORKING SHIFT, through the pulverisation/size reduction/ pre-fermentatation stage.
2. The YIELD OF SPECIFICATION GRADE COMPOST is calculated as a percentage of the Rated Throughput of the Feedstock.

The Contractor must specify :

1 Rated Throughput of Composting Plant

	FULL PLANT		EACH FLOW-LINE	
	Tonnes	Cubic Metre	Tonnes	Cubic M/
The plant will consistently receive, feed and process in ONE EIGHT WORKING SHIFT ----------	.....	.....	.....	.....

The specified Rated Throughput to be:

700 tonnes (2400 cubic metres UNSORTED municipal Refuse

AND

300 tonnes (400 cubic metres) Semi-dry Sewage Sludge (66.6.% moisture w/w)

It is acknowledeged that provision has been made to add liquid sewage sludge (97% moisture w/w) in sufficient quantity to adjust the moisture level of the feedstock prior to fermentation to 55% w/w.

2. Processing Rejects

The estimated amount of rejects as a percentage of the rated throughput are:

Primary Milling and Screening	.....%
Final Cleaning and Grading	.....%
Recovered Materials (Metals)	.....%
Other Rejects (if any)	.....%

3. Composting Loss

It is estimated that the processing loss during composting will be ..... per cent of the rated throughput.

4. Duration of Composting Stages

a -	From Reception to completion	..... days
b -	Fermentation Stage	..... days
c -	Maturation Stage	..... days

5. Yield of Specification Grade Compost.

The estimated reliable yield of specification grade compost will be ..... per cent of the rated throughput of feedstock.

6. Total Electric Absorbed Power

The total power requirements of the composting plant in one eight hour working shift and operating at the maximum rated throughput will be .....

7. Environmental Protection

The Composting Plant is designed to operate without predjudice to Public Health arising from excessive noise, vibration, dust emmision, smell and or pest infestation.

8. Defects in Works

Article 28 of the Contract specifies the full warranties to be provided in this respect. In Article 28.7 however the period in respect of Civil Works shall be ten years.

SCHEDULE No 3

REVISION OF CONTRACT AND TENDER DOCUMENT

CONTRACT TENDER DOCUMENT

CORRIGENDUM

OF

REVISION AND AMENDMENT OF DOCUMENT
RECOMMENDED ON 4th FEBRUARY 1984

Page	Para	Line	
			Article No 2
2.	2.3.2.		Delete sub clauses (c) and (d) and substitute
			" (c) Technical Data Sheets Nos 1 to 7 specify the detailed information which must be submitted with each tender The data submitted must be strictly presented in the order set out in the Technical Data Sheets.
			The Technical Data Sheets are contained in Annex XV "
3	2.3.2.		Delete the whole of page 3 (including the suggested revisions) and substitute
			" (d) Guarantees covering the rated throughput of the plant, processing rejects, duration of various composting stages, yield of specification grade compost, civil works, and electricity consumption are specified in Technical Data Sheet No 7
			(e) The Specification of the Quality of the Compost, and Materials recovered from the feedstock is contained in Annex IX. This must be strictly observed.
			(f) The Composting Plant must not create environmental nuisance and Technical Data Sheet No 7 contains the necessary guarantee to this effect.

Note Delete completely the text of Annex IX and substitute NEW TEXT as follows:

Alter Title of Annex IX to read "Quality of Products from Plant"

See Next Page for substituted Text for Annex IX

IMPORTANT NOTE: The List of Contents at the start of this document is incorrect. This should be re-drafted.

ANNEX IX

QUALITY OF PRODUCTS FROM PLANT

1. Specification Grade Compost

The compost produced by the Composting Plant MUST satisfy the following requirements:

a - During the process of fermentation the feedstock must be throughly pasteurised by being subjected to a self generated temperature of not less than 60°C for a continuous period of not less than four full days (96hours).

b - The compost must be fully mature and stabilised at completion so that it is unable to cause damage to soils or to crops. It must therefore be free from noxious smell and its temperature before removal from the maturation unit must not exceed 40°C, and its temperature must not show any increase when the material is subject to further fermentation tests under optimum conditions.

c - Its granulometry shall be such that 90 per cent by weight of compost as removed from maturation unit will pass through a 40mm square mesh seive. The oversized material is to be re-processed through the plant.

d After Cleaning and refining the compost shall

i - Be free from hard particles and foreign matter of a size which is retained on a 10mm square mesh seive.

ii - Be free from visually detectable glass or ceramic splinters and any particles of such material of a size which will be retained on a 1.5mm square mesh seive.

e. The moisture content of compost before being distributed to users shall not exceed 35 per cent by weight.

f The Nitrogen content must not be less than 0.5 per cent of dry matter by weight.

g The Carbon to Nitrogen Ration(C/N) shall not exceed 24 at any time, but the general acceptable average value will be 20.

h The Ph Value shall not be less than 7 and not greater than 8.

i. The level of salinity (sodium chloride) shall not exceed that of the average value for soils in the Damscus area.

j. It shall not contain pathogenic germs or viable plant seeds.

l. The compost shall be graded into two qualities by size:

Medium Compost - Passing a 20mm square mesh seive
Coarse Compost - Passing a 40mm square mesh seive but retained on a 20mm square mesh seive

2. Merchantable Rejects

Any recovered materials from the feedstock shall be sufficiently clean to have a commercial sale value. This particularly applies to recovered metal.

Page	Para	Line	Article 3
7	3.1.	2	For "8 hours" read "in an eight hour shift"
7	3.2.	4	Delete remainder of article 3.2. from the words " The Contract will include:" and substitute

The Contract will include for the provision of

1. All fixed mechanical and electrical plant;
2. All mobile plant and vehicles including:-
   - a - Four Wheel Drive Loading Shovels (with 3 cub metre buckets fitted rapid action retaining clamps) required for handling and loading refuse and compost .
   - b - Compaction type Bulk Refuse Transportation Vehicles for taking process residues to landfill. (30 km distant)
   - c - Rough Terrain Dump Trucks for delivery of compost to users (Average haul 15 km)
3. All buildings and structures including:-
   - a - Adminstration offices
   - b - Amenity block
   - c - Workshop and stores
   - d - Gate House
   - e - Reception Hangar, Milling Hall, Fermentation Unit and all other buidings and structures required to accommodate the processing plant.
4. A central 40 tonne capacity weighbridge with control office.
5. All security fencing and gates.
6. Adequate artifical lighting to external areas.
7. All Maturation, Stockpile and other processing areas external to buildings, and all internal roads and vehicle parking areas to be properly formed constructed surfaced and drained.
8. All internal site services to include:-
   - a - Electricity Supply for light and power.
   - b - Water supply for drinking, sanitation and processing
   - c - Surface Water and Foul Water Drainage.
   - d - Fire protection and alarms.
   - e - Tannoy service.
   - f - T.V. Monitor for critical points.
9. All essential servicing equipment, tools and spares for maint /ainance of fixed and mobile plant
10. All essential equipment and chemicals to establish a suitable Plant Laboratory.
11. All Site Landscape works including the provision of adequate wind breaks.

Page.	Para.	Line.	
9	3.3.		At the end of this Article 3.3. insert the following subclause " The Model Form of Contract also contains a series of Technical Annexures the purpose of which is to detail all the technical parameters of the works, the procedures for implementing the various provisions of the contract, and the performance guarantees to be demonstrated by the Contractor including the procedure for proving them. To enable these annexures to be properly completed and for fair evaluation of the tenders submitted seven Technical Data Sheets have been prepared which specify the information which the contractor must supply with his tender. The data must strictly follow the order set out in the Technical Data Sheets. The Technical Data Sheets are contained in Annex XV"
10	3.7.		Add at the end of Article 3.7. " the complete specification for compost quality is contained in Annex IX
9	3.6.		At the end of Article 3.6. add " The feedstock will consist initially of UNSORTED Municipal refuse of a variable nature composition and density: and delivered to the composting plant under the normal refuse collection operations in the City of Damascus. Sewage Sludge is not currently available but will be available eventually and therefore the composting plant must have the capacity to deal with this in the future. The AVERAGE composition and density of Municipal refuse as determined by careful study is recorded in Annex III. It must be noted however that the composition of each vehicle load of refuse will vary and that there will also be marked seasonal variations. The composting plant must be designed for meximum flexibility and be fully capable of accommodating these variations in the composition and density of the feedstock"
10	3.7.		Add to item a- the words "for a minimum period of 96 hours at a temperature of not lower than 60°C" Delete item e- and substitute "have no visually detectable glass or ceramic splinters, OR any particles of such materials ... which will be retained on a 1.5mm square mesh seive.
11.	4.1.5.		Add to item c - the words "or other forms of size reduction of feedstock"
11/12	4.2.		Delete the whole text of this, and substitute the following NEW TEXT

(See next page)

4.2 THE SITE OF THE PLANT

The Composting Plant is to be designed, supplied and constructed by the CONTRACTOR so as to utilise the site to its best advantage, to provide for future increase in throughput of the plant, and to provide an environmental acceptable form of development.

Data relating to the site is as follows:

In this annexure the fullest information regarding the site shall be included under the following main sections:

a - Precise location and available main highway access routes. A LOCATION MAP at a scale of not less than 1 in 25,000 shall be included.

b - Area of land available. A PLOT PLAN to a scale not less than 1 in 500 shall be included.

c - Site Characteristics.

d - Topography of adjacent land to site

f - Levels and Contours of site and immediate adjacent land.

g - Surface geology and detail of water-table

h - Road access.

i - Facilities for disposal of surface water run-off.

j.- Facailities for disposal of sewage from the plant.

k - Availability of water supply

1 - Potable water for drinking and sanitation.

2 - Process water for compost production.

3.- Non-potable water for site cleaning and for fire fighting purposes.

l Availability of Electric Power.

m Availability of Public Telephone Service.

n Special features of the site including any trees or other items which should be preserved.

Page.	Para.	Line	
19	5.2.	2	For "eight hours" read "in an eight hour shift"
		5	For " sixteen hours" read " in a double eight hour shift (16 hours)"
21	5.9	5th Para Line 2	For"20mm"read"25mm" (in two places) For "400mm read"40mm" Insert the word "square" between "40mm and mesh"
36	Annex 1		Delete Section B (1 to 4) Add Sub-clause"11 - Tender Data Sheets must be submitted under each of the respective headings contained in Annex XV. The information submitted shall be recorded strictly in the order listed in the Technical Data Sheets"
38	Annex 1 Para 6	19	For "8 hours per day" read "in an eight hour shift per day"
41/42	Annex III		Delete Paragraphs 3 to 5 inclusive on page 42 and substitute

3 Meteorological Data

Meteorological data for at least 10 years should include:

(a) Available Average Data

The available meteorological data for Site (or the nearest station to site) should contain the following information for

	Summer April to September	Winter October to Mar
(i) Daily average maximum temperature, °C.		
(ii) Daily average minimum temperature, °C.		
(iii) Monthly rainfall, mm.		
(iv) Dry and wet bulb (°C), preferably both for morning (indicate time) and afternoon.		
(v) Prevailing wind direction, (if available, a complete thumb-card indicating the yearly average occurences of winds in the prevailing direction should be attached).		
(vi) Average wind velocity km/hr		

(b) Extremes recorded

This should contain data on the extremes recorded and when, for:

(i) Maximum temperature, °C.		
(ii) Minimum temperature, °C.		
(iii) Maximum rainfall recorded in 24 hours. (Indicate one and two hourly intensity.)		
(iv) Maximum recorded wind velocity. km/hr		

4 Soil and seismic Conditions

These should include:

(a) The type of soil conditions.

(b) The sub-soil water table level at Site (indicate whether water is sweet or saline).

(c) The load bearing capacity in the area. If the soil bearing capacity differs considerably in various places of the plot, a plot plan indicating drilling points and findings should be attached.

(d) Any available data on earthquake in or near the Site and seismic design data commonly used in the area.

5. Refuse Deliveries

The Damscus Refuse Collection Service operates 24 hours per day and seven days per week with peak deliveries around noon and midnight.

The average pattern of deliveries is as follows

	No of Loads	Tonnes	Cubic Metres
0200 to 0600 hours			
0600 to 1000 hours			
1000 to 1400 hours			
1400 to 1800 hours			
1800 to 2200 hours			
2200 to 0200 hours			
Totals	Approx 240	700	2400

6. Reception Storage

The minimu capacity of temporary storage of refuse to be not less than 3000 cubic metres.

7. Characteristics of Utilities

7.1. Electric Power Available Electric Power has the following characteristics

(Indicate voltage, phases, cycles, 3 04 4 wire system including voltage and frequency fluctuations)

7.2. On-Site Electric Generation The OPTIONAL GENERATION EQUIPMENT shall be capable of maintining the throughput of the plant using one flow-line for an extended period.

7.3. Water Supply

Process Water (specify potential source and quality and quantity)

Drinking & Sanitation (Specify source, quality and quantity)

Fire-fighting and Plant Cleansing (Specify source and quantity)

(If piping, pumping and site storage is needed - this must be stated)

8. Restrictions on Transportation of Equipment to Site

Data should be given to include:

a) - Maximum Lift available at Port (If ships derricks can be used this should be stated.

b) - Maximum dimensions and weight which can be carried by road from Port to the Site including any restrictions by bridges or tunnels.

8 Statutory Regulations

The statutory regulations relating to standards or other codes, or Factory Ac applicable in the PURCHASER's country should be specified herein. This particularl refers to acceptance procedures applicable for endorsement of foreign standards prior to manufacture of the Equipment. If necessary translation of local standards and regulations should be prepared and annotated to point out differences and permissible exceptions for imported quipment.

Page	Para	Line	
46	ANNEX X - Training		Insert at commencement of this Annex " Attention is directed to the information required by Technical Data Sheet No 4"
52	ANNEX XIV Performance Tests		Insert at Commencement of this Annex " Attention is directed to the information required by Article 4 of Technical Data Sheet No 7"
	1 Treatment and Handling Section		Delete existing text and substitute a - A six day 100 per cent rated throughput test on FULL plant followed by: b - A three day 100 per cent rated throughput test on EACH flow-line followed by c A eight hour test on FULL plant at 110 per cent of rated throughput.
53	ADD NEW ANNEX XV -		Technical Data Sheets (For text see appended pages)

ANNEX XV

CONTRACT TECHNICAL DATA SHEETS

These sheets specify the information which Contractors are requested to submit with their tenders. This information will subsequently be incorporated into annexures to the Contract Document.

It is important that the the information in respect of each item be submitted strictly in the order shown in the Technical Data Sheets.

DESIGN CRITERIA EMPLOYED BY THE CONTRACTOR

1. Refuse Composition — Per Cent by weight

   a- Compostible Material
   b- Recoverable rejects (metal)
   c- Disposable Rejects

   d- Moisture Content

   e- Allowances made for seasonal variations.

2. Refuse Density — kg/cubic metre

   a- Density of feedstock

   b- Allowance made for seasonal variation

3. Rated Throughput of Plant — Shift of eight hours

	Tonnes	Cubic Metre
a- Complete Plant		
b- Each Flow Line		
c- Milling and Pre-Fermentation Plant		
d- Cleaning and Grading Plant		
e- Bagging Plant		

4. Process Retention Periods

   a- Moisture Adjustment
   b- Fermentation
   c- Maturation

	Tonnes	Cubic Metres

5. Processing Rejects

   a- Milling and Pre-fermentation Treatment
   b - Primary Screening (if any)
   c- Cleaning and Grading
   d- Magnetic extraction of ferrous metal

6. Processing Densities — kg/cubic metre

   a- After Milling /Primary Screening
   b- After Moisture Adjustment
   c- Start of Fermentation
   e- End of Fermentation
   f- End of Maturation
   g- After Cleaning and Grading

7. Percentage yield of compost

   a - The estimated yield of specification grade compost as a percentage of rated throughput.

8 Temporary Storage of Feedstock

   a- Volume and method of temporary storage of feedstock prior to processing ..... cubic metre

9. Meterological

a- Maximum Ambient Temperature ^{o}C
b- Minimum Ambient Temperature ^{o}C
c- Maximum Rainfall Intensity mm in .....
d- Maximum Wind Velocity

10. Soil and Seismic Conditions

a- Load Bearing Capacity
b- Protection against sulphate action on concrete
c- Depth of water table below ground surface
d- Seismic factors (if any)

11. Process Water

a- Requirements (maximum) litres/hr
b- Maximu degree of salinity of water (if any)
c- Acceptable sources of process water.

12 Electricity Requirements

a- Total installed demand
b- Total absorbed power
c- Required Voltages and characteristics
i. High Tension ( ) V 3Phase, 3wire ( )Hz A.C.
ii. 3-Phase ( ) V 3phase,( )wire,( )Hz AC
iii. Single Phase ( ) V 1phase,( )wire,( )Hz AC

13 Standards, Codes of Practice and Regulations

A complete list of the Standards, Codes of Practice and Regulations used for the design of the machinery, plant equipment, electrical installation and civil works shall be given.

PROCESS DESCRIPTION, SUPPLY OF EQUIPMENT, AND SERVICE FACILITIES

NOTE: Much of the information reuired by this Technical Data Sheet will be the subject of discussion and agreement between the Contractor and Purchaser at the meetings specified in Article 6 of the Contract.

1. Process Description

1.1. A full process description shall be provided starting at the weighbridge and reception to the Plant and through the succesive stages to final distribution of the compost. It shall deal with the various stages in the following order:

a - Reception and temporary storage of feedstock prior to processing;
b - Method of feed to Processing Plant;
c - Pulverisation Milling Shredding or other size reduction;
d - Primary Screening (if any);
e - Moisture adjustment of feedstock;
f - Fermentation;
g - Maturation or curing;
h - Final Cleaning and Grading;
i - Disposal of processing rejects;
j - Disposal of recovered metals and other materials;
k - Distribution to users of final compost.

1.2. The items of plant, machinery and equipment shall be given the same distinguishing numbers in the process description as is contained a a flow-sheet which must form part of the submission.

1.3. The following information must be specifically included in the process description:

a - From reception of feedstock, the maximum time required by the process to produce specification grade compost

b - The estimated reliable yield of specification grade compost from each tonne of feedstock.

c - The estimated quantity of disposable rejects from the rated throughput of feedstock

d - The estimated quantity of marketable recovered materials (metal) from the rated throughput of feedstock.

e - The system of cleaning and grading the final compost to ensure it conforms to the specification contained in Annexure XXX

f - The recoomended personnel establishment for the plant.

g - Total power consumption of the full plant at the rated throughput of the feedstock.

h - The provision made in the design of the plant to facilitate any necessary extension of units to enable the plant to double its rated throughput by double shift operation of the treatment plant (Reception, feed, pulverisation, screening, mixing and moisture adjustment) This particularily applies to the Fermentation, Maturation and Compost Storage Units.

2. Plant Machinery and Equipment Layout and Interconnections

2.1. A layout of the complete composting plant including all ancilliary buildings and equipment shall be provided as drawings No...andNo....

2.2. A layout of the complete site including roads, parking areas, weighbridge, and paved and surfaced processing area, and showing all civil engineering works including windbreaks and landscaping of the site shall be provided as Drawings No.... and No .....

2.3. The control monitoring and instrumentation layout and system shall be indicated in Drawings No.... and No .....

2.4. A detailed equipment layout plan shall be provided as Drawing No .....

2.5. A one-line electrical diagram showing the electrical design to be submitted as Drawing No .....

2.6. Details of the internal supply and storage of process water shall be shown in Drawing No .....

2.7. Details of the control panels shall be submitted indicating their precise location.

2.8. A detailed drawing No .... shall be submitted showing the feedstock reception and storage arrangements, and also the method of feeding the processing plant

2.9 A detailed drawing shall be submitted No .... indicating the essential features of the Feedstock treatment plant (i.e. Pulveriser Mills, Screens Mixers and Moisture Adjustment System)

2.10 A detailed drawing showing the Fermentation Unit(No .....) This shall clearly indicate the method of aeration of the compost and any compost turning machinery

2.11. A Drawing No ..... showing the Maturation Unit and method of placing and withdrawing compost therefrom.

2.12. A drawing No .... showing the details of the Cleaning Grading and Bagging Unit.

3. Equipment List

3.1. A complete list of the machinery and equipment (fixed and mobile) to be supplied under the contract. The machinery and equipment will include all that is required within the Site Limits (Annexure III) and to produce the maximum quantity of specification grade compost from the rated throughput of feedstock, and to satisfy the guarantees contained in the Contract.

3.2. Each item of machinery and equipment shall be detailed as follows

a - Name of machine or equipment
b - Number on flow sheet
c - Size, capacity and other technical data.
d - Weight (where significant)
e - Material of construction
f - Safety devices to prevent access to moving parts
g - Means of access for maintenance
h - Specification of electric motors and drives.
i - Name and address of manufacturer.

4. Utilities

4.1. The services which are to be designed and supplied for the Composting Plant shall be listed and described, and any machinery or equipment for such services shall be detailed in the same manner as under 3.2. above.

4.2. The services include but are not necessarily comprehensive in scope:

a - Processing Water System
b - Sanitary Water System
c - Fire-fighting and alarm system
d - In-site sewage disposal system
e - In-site surface water drainage disposal
f - In-site telephone and tannoy system
g - Plant overload controls and emergency stop systems
h - Artificial lighting (internal and external)
i - T.V.Monitoring System
j (OPTIONAL EXTRA) Standby Electric Generator and switch over system (with costs)
k - Electrical power distribution system, lighting system, "wander" power outlets, earthing system (Motors shall be detailed under each item in the euipment, utitlity and ancilliary building sections)
l - Feedstock Moisture Adjustment System.
m - Dust Aspiration System for Reception Area and Storage Unit
n - Automatic Door system to Reception and Storage Unit.
O - Weighbridge Control and Ticketing System
p - Composting Plant Cleaning System

5. Ancilliary Buildings Etc

5.1. The Ancilliary Buildings that shall be provided for the Composting Plant include, but are not necessarily comprehensive in scope:

a - Administration Offices and Control Laboratory
b - Amenity Block (Messroom, Toilets, Laundry etc)
d - Weighbridge and Control Cabin
e - Workshop and stores
f - Gate House
g - Receptionand Storage Hangar
h - Processing Hall (pulveriser etc)
i - Fermentation Hangar
j - Cleaning and Grading Unit
k Site Garage for Mobile Equipment.

5.2. The equipment, furnishings, servicing plant tools and spares, laboratory equipment and chemicals, shall be listed and described.

5.3. The Site Security Fence and Gates shall be specified in detail.

5.4. Windbreaks and landscaping works shall be described.

6. Mobile Plant and Vehicles

6.1. The essential vehicles and plant required for handling and stacking compost at various stages of production, and for the disposal of rejects, and for the regular distribution of finished compost to users shall be be detailed in the same manner as under 3.2 above and be clearly classified as follows:

a - Mechanical Loading Shovels

b - Mobile Belt Conveyors

c - Compaction Type Bulk Refuse Transportation Vehicles (including suitable loading skips or containers)

d - Rough Terrain Dump Trucks

e - In-site servicing vehicles (i.e. Vans, Platform Trucks etc)

f - Mobile Fire Pump Trailer

7. Environmental Protection and Safety Systems

7.1. Details shall be given of design measures and equipment proposed to effect environmental protection against:

a - Emmision of dust to atmosphere
b - Excessive noise and vibration
c - Emmision of noxious odours and smell
d - Pest infestation from flies, insects, scavenger birds rodents and domestic animals such as dogs and goats.

7.2. Details shall be given of design measures and equipment proposed to protect the health and safety of workpeople employed on or visiting the plant, and shall include:

a - Facilities to maintain the plant in a clean condition,
b - Protection against explosion within the plant
c - Description of ladders, walkways and safety equipment including emergency stopping devices for the plant and all machinery units, and covers and locking devices to prevent entry into any moving part.
d - Warning and information signs.
e - Dust Control and Fly Suppression within the Reception Storage Unit.
f - Air Conditioning of Cabs of Loading Shovels and vehicles working in extreme conditions.
g - Maintenance, Servicing , Lifting and Hoisting Equipment and details of suspension systems.

8. Miscellaneous

8.1. Details shall be given of the equipment to be provided for the recovering in a merchantable condition of metals and other materials from the feedstock. In particular the method of extraction of ferrous metals, the subsequent cleaning and removal of trash therefrom and the final baling of the metal shall be given in full detail.

8.2. Provision for the on-site storage of fuel oils for plant and vehicles shall be made to accommodate one months usage of fuel. Details of storage shall be given and also of Deisel Pumps for supply of fuel to the vehicles and plant.

8.3. Where Pulveriser Mills are included in the scheme details shall be submitted as follows:

a - The type of hammer employed and the current cost of a full set delivered to Damascus.
b - The average man-hours required to effect a change of hammer
c - The estimated quantity of feedstock throughput between a change of hammers.
d - The method adopted to prevent mechanical damage to the pulveriser mill from large foreign objects in the feedstock.

TIME SCHEDULE FOR IMPLEMENTING EACH STAGE OF THE CONTRACT AND DELIVERY OF DOCUMENTS

1. Time Schedule

1.1. The overall time schedule for completion of the work is to be shown in a BAR CHART to be attached herafter as part of ANNEXURE XV of the Contract Document. This BAR CHART to be based on the following considerations:

a - All dates and periods shall start with the EFFECTIVE DATE

b - The delivery FOB of equipment shall start and end by the dates indicated.

c - The transport of FOB Deliveries to Site to be indicated

d - The date of commencement of Civil Works shall be shown

e - The start of erectiion of mechanical plant shall be shown

f - The completion dates for civil, mechanical and electrical works shall be indicated

g - The date for INITIAL OPERATION of the Plant shall be shown

h - The date for the start of COMMERCIAL PRODUCTION shall be indicated.

2. Technical Documentation

2.1. The Technical D ocumentation described in AnnexureV shall be supplied by the CONTRACTOR to the PURCHASER and shall include all the documents necessary to enable the Purchaser to establish the source of the plants, machinery and equipment (fixed and mobile) and of spare parts. The technical documentation shall be in the ..... language.

2.2. The final supply of the various documents shall be made within the following specified periods starting from the effective date

2.2.1. Process Documentation — Period

a - Flow Sheets
b - Control Diagrams
c - Material Mass and Power Balances
d - List and process Data Sheets for all equipment
* e - Finalised list of operating personnel and their duties.

2.2.2. Equipment and Machinery Documentation

a - Detailed specifications of all equipment and machinery to be installed.
b -Manufacturers Catalogues
c - Manufactuerers Drawings
d - Assembly drawings for machinery to be assembled on site
* e - List of recommended spare parts
f - Manufacturers Certificates and Documents concerning workshop testing and acceptence by authorised inspection in the manufactueers country
g - Maintenance and lubrication Schedules

2.2.3. Control and Monitoring Documentation

* a - Detailed Diagrams
b - Detailed Specifications and Manufacturers Literature and instructions.

2.2.3. Period

c - Layout of control room
d - Specification of Control Panels
e - List and make of instruments
f - Data sheets for instruments
g - Cable List
h - Operation and Maintenace Instructions
i - List of protective fuses to all equipment and their specification and numbers
j - List of settings of switches, relays etc for operation of alarms, interlocks etc.

2.2.4. Electrical Documentation

a - Electric Power Balance
* b - Electric revised and final One-line Diagrams
c - Electric layout and cable routing
d - Electric equipment list and specifications
e - Operation and maintenance instructions
f - Final Plant Lighting system (internal and external) and list of equipment

2.2.4. Civil Engineering (drawings to be full civil engineering ones)

* a - Final Site Layout Plan
* b - Final Foundation Layout Plan
* c - Final underground installation plan (Trenches, pipes, cables, sewers, etc)
d - Final drawings for all buildings including location of machinery and equipment
e - Final details of special constructional elements (slopes, wet areas, anti-corrosion protection, maintenance access, etc)
f- Finalised Air-conditioning, ventilations and Dust-aspiration installation drawings
g - Detailed layout and constructional drawings for roads, parking areas, maturation, storages and other external processing areas, including surface water drainage, provision of windbreaks and final landscaping.
h - Final detailed drawings of Security fencing and gates
i - Final drawings for provision of weighbridge and control cabin, with traffic management plan for use of whole site.

2.2.5. General Documentation

a - Supply of complete set of As-built drawings
* b - All documents supplied by Process Licensors
* c - All operating Manuals including emergency instructions
* d - Detailed Code of Practice for the safe operation of the plant and the health and safety of the plant personnel
* e - Detailed Maintenance Instructions
f - Recommended List and general specifications of
1. Workshop equipment
2. Laboratory equipment
3 Fire fighting and safety equipment
4 Site Communications systems

2.2.6. Procurement Documentation

* a - Detailed List of Spare Parts
* b - List of Vendors for Spare Parts
* c - Procurement Documentation as Article 10

2.3. Delivery procedure of documentation

The procedure for the delivery of documentation supplied by the CONTRACTOR shall be as follows:

2.3.1. The documentation shall be despatched to the PURCHASER by air-way bill on a freight pre-paid basis, and the PURCHASER shall acknowledge each despatch immediately after receiving it. The date of delivery shall be the actual date of of the air-way bill.

2.3.2. The documentation shall be supplied in SIX copies and one reproducible copy (with the exclusion of the catalogues, pamphlets and manuals supplied by Sub-Contractors)

2.4. The items oftechnical documentation marked • are the documents liable to liquidated damages pursuant to Article 27 of the Contract.

2.5. The approval of the PURCHASER shall be obtained for documents included herein but specified in Annexure V.

ANNEXURE XIII

TECHNICAL DATA SHEET NO 4

TRAINING OF THE PURCHASER'S PERSONNEL

1. Staffing Requirements

1.1. The Contractor shall specify the staffing requirements for the composting plant in respect of

a - Management
b - Technical Operation and supervision
c - Skilled operatives
d - Unskilled workmen.
e - Maintenance.

1.2. He shall list the staff requirements according to various categories and functions.

2. Training of Personnel

2.1. The Contractor shall schedule the personnel for which training will be necessary and the extent to which overseas training is desirable.

2.2. The Schedule shall contain the following information:

a - Staff Designation of Trainees (each trainee to be itemised)

b - Training Period for each Trainee

c - Subjects for training of each trainee and where training is to be obtained.

ANNEXURE XXI

TECHNICAL DATA SHEET No 5.

RATES, CHARGES AND PERSONNEL SERVICES

For completion of the Annexure to the Contract the following data to be supplied

1. Contractors Home Office Charges on a cost-plus basis

1.1. Direct cost of personnel

Designation	Cost per hour
.....	.....
.....	.....

1.2. Overheads and Profits

Perecentage increase over direct costs .....%

2. Contractors Expatriate Personnel Charges

2.1. For each day of absence from Home Office

Personnel	Rates per day
.....	.....
.....	.....

3 Overtime Charges

Up to 54 hours/week	.....% of normal rates
Above 54 hours/week	.....% of normal rates
Weekly and public holidays	.....% of normal rates

4. Local Allowance for Expatriate Personnel

Personnel	Rate per day of presence on site
.....	.....
.....	.....

CIVIL ENGINEERING SPECIFICATIONS

The following data to be provided by the Contractor:

1. List of Civil Engineering Works

This to be complete and indexed in relation to a layout plan

2. General Specifications

2.1. Buildings Each building to be detailed as follows

a Dimensions
b Location of floors and sub-floors
c Details of foundations, structure, walls and cladding, roof, doors and windows, flooring, fittings, services, air-conditioning, etc
d Line drawings of the buildings

2.2. Roads and Paved Areas

a Level and slope
b Type of earthwork
c Dimensions
d Construction,(sub-base - base - surface - drainage)
e Layout drawing

2.3 Machinery Foundations

a - Full details including load bearing conditions

2.4. Underground works (cables, drainage, water supply etc)

a - Layout drawings
b - Details of construction
c - Sanitary drainage and sewage disposal
e - Weighbridge

2.5. Miscellaneous

a - Security Fencing and gates
b - Windbreaks and landscaping
c - External artificial lighting
d - Traffic Management
e - Painting and decoration schedule

3. Design Codes, Material Specifications and Civil Engineering Standards

These to be detailed, preferably in a separate volume of specifications and standards, and should follow generally recognised international standards and codes of practice.

C-559

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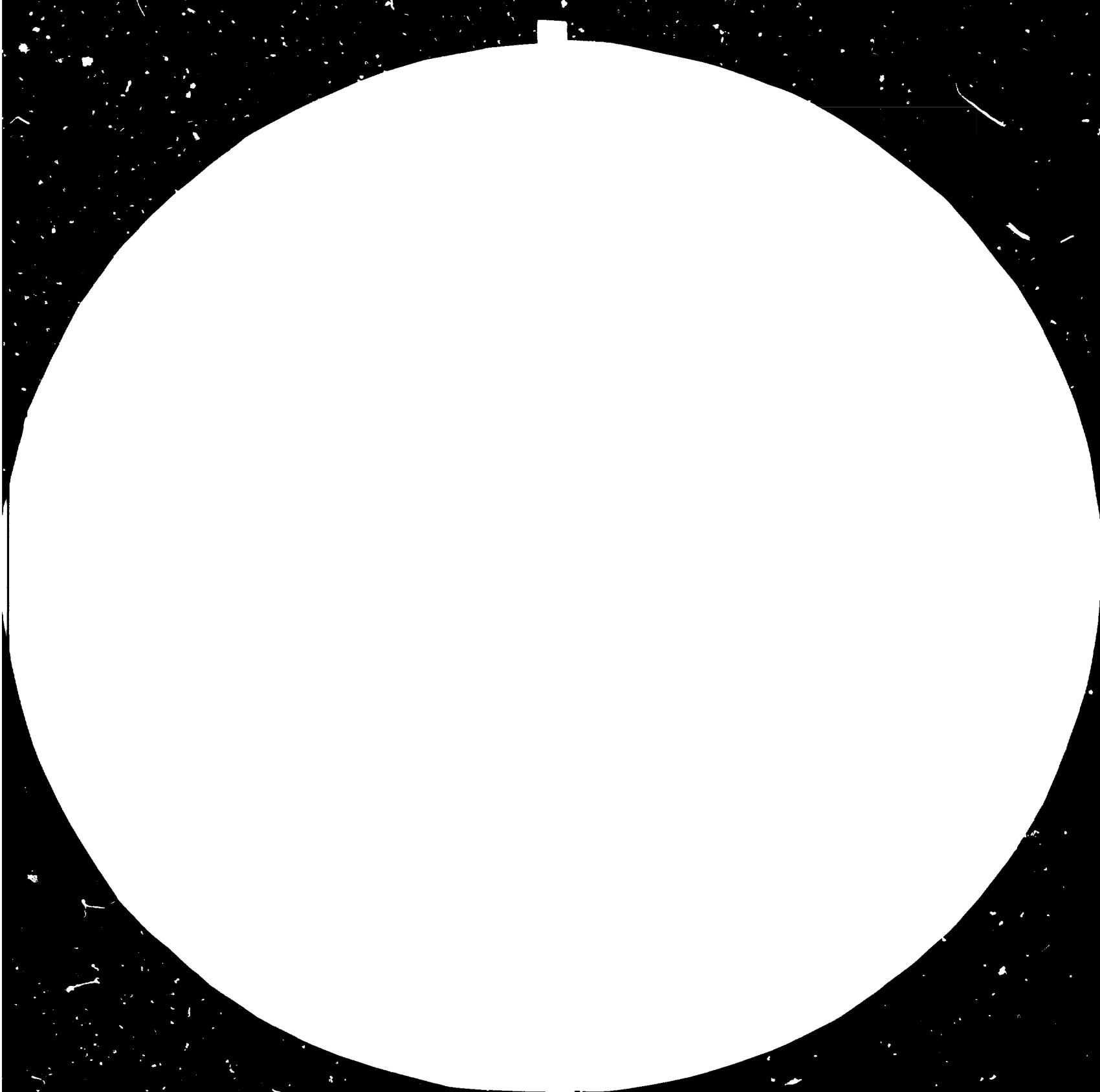
11 5.5+10

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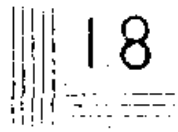
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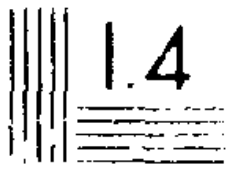
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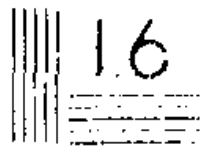
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GUARANTEES OF THROUGHPUT OF FEEDSTOCK AND PRODUCTION YIELD OF COMPOST ETC

NOTE:
1. The time required for the feedstock to pass the various stages of the composting process varies widely
2. RATED THROUGHPUT of a COMPOSTING PLANT means the quantity of feedstock which can be consistently fed and processed in ONE EIGHT WORKING SHIFT, through the pulverisation/size reduction/ pre-fermentatation stage.
2. The YIELD OF SPECIFICATION GRADE COMPOST is calculated as a percentage of the Rated Throughput of the Feedstock.

The Contractor must specify :

1 Rated Throughput of Composting Plant

	FULL PLANT		EACH FLOW-LINE	
	Tonnes	Cubic Metre	Tonnes	Cubic M/
The plant will consistently receive, feed and process in ONE EIGHT WORKING SHIFT ----------	.....	.....	.....	.....

The specified Rated Throughput to be:

700 tonnes (2400 cubic metres UNSORTED municipal Refuse

AND

300 tonnes (400 cubic metres) Semi-dry Sewage Sludge (66.6.% moisture w/w)

It is acknowledeged that provision has been made to add liquid sewage sludge (97% moisture w/w) in sufficient quantity to adjust the moisture level of the feedstock prior to fermentation to 55% w/w.

2. Processing Rejects

The estimated amount of rejects as a percentage of the rated throughput are:

Primary Milling and Screening	.....%
Final Cleaning and Grading	.....%
Recovered Materials (Metals)	.....%
Other Rejects (if any)	.....%

3. Composting Loss

It is estimated that the processing loss during composting will be ..... per cent of the rated throughput.

4. Duration of Composting Stages

a -	From Reception to completion	..... days
b -	Fermentation Stage	..... days
c -	Maturation Stage	..... days

5. Yield of Specification Grade Compost.

The estimated reliable yield of specification grade compost will be ..... per cent of the rated throughput of feedstock.

6. Total Electric Absorbed Power

The total power requirements of the composting plant in one eight hour working shift and operating at the maximum rated throughput will be .....

7. Environmental Protection

The Composting Plant is designed to operate without predjudice to Public Health arising from excessive noise, vibration, dust emmision, smell and or pest infestation.

8. Defects in Works

Article 28 of the Contract specifies the full warranties to be provided in this respect. In Article 28.7 however the period in respect of Civil Works shall be ten years.

ANNEXURE V.

DOCUMENTS REQUIRING THE APPROVAL OF THE PURCHASER.

1. Technical documentation containing the following data shall require the approval of the PURCHASER

1.1. Technical Data Sheets

Technical Data Sheets are to be submitted at the time of tender and contain the information requested in the following Technical Data Sheets and prepared strictly in accordance with the tabulation of the items.

Technical Data Sheet No 1	Design Criteria employed by the Contractor
Technical Data Sheet No 2	Process Description, Supply of Equipment and Service Facilities
Techincal Data Sheet No 3	Time and Progress Schedule
Technical Data Sheet No 4	Personnel Training
Technical Data Sheet No 5	Rates Charges and Personnel Costs
Technical Data Sheet No 6	Civil Engineering Specification
Technical Data Sheets No 7	Guarantees of Throughput and Yield

1.2. Process

(a) Isometric Drawing to describe plant and method of operation.

(b) Process Flow Sheets with materials and mass balances

(c) Control and instrumentation diagrams

1.3. Equipment and machinery (fixed and mobile)

(a) Specifications and designed capacity

(b) List of recommended Vendors

(c) List of recommended soare parts

1.3. Layout

(a) General layout of the works

(b) Plot plan for the plant and for each flow-line

(c) Lay-out of machinery

(d) Layout of fermentation unit(with details of possible extensior

(e) Layout of Maturation Unit (with details of possible extension)

(f) Layout of Cleaning Grading and Bagging Unit

(g) Layout of compost storage area.

1.4. Instrumentation

(a) General description of instrumentation and T.V.Monitoring

(b) General Description of control system and proposed types of instrumentation

(c) Description of alarms and interlocking systems

(d) Specification of control panels and desks

(e) Fire control system and alarms.

1.6. Electrical

(a) Electrical Power Balance and Motor List

(b) Single Line Electrical Diagram

(c) Plant Lighting proposals (internal and external)

1.7. Civil Engineering

(a) General Site Plan

(b) Details of Security Fencing and Gates

(c) Foundation layout with locations and diamensions.

(d) Layout of under-ground installations (sewerage, drainage, process water, sanitary water supply, electrical conduits, fire hydrants, etc)

(e) Layout of internal roads, parking areas, and surfaced processing areas.

(f) Preliminary profile drawings of the buildings with location of equipment, and details of foundation loading.

(g) Drawings showing areas where anti-corrosion protection of paved areas, floors and structures is necessary

(h) Location of maintenance access areas and apertures

2. As-built Documentation

(These documents do not require the Purchasers approval, but the Purchaser shall have the right to check them if desired)

(a) Complete civil engineering drawings for all buildings, including foundation, steelwork and all structural details.

(b) Complete machinery and equipment layout

(c) Complete control and instrumentation drawings

(d) Complete electrical layout and cable /fusing details

(e) Complete list of plant and equipment (including all mobile plant, with sizes and details of all technical parts, materials of construction and names and addresses of suppliers.

ANNEXURE X_{II}

QUALITY OF PRODUCTS FROM PLANT

1. Specification Grade Compost

The compost produced by the Composting Plant MUST satisfy the following requirements:

a - During the process of fermentation the feedstock must be throughly pasteurised by being subjected to a self generated temperature of not less than 60°C for a continuous period of not less than four full days (96hours).

b - The compost must be fully mature and stabilised at completion so that it is unable to cause damage to soils or to crops. It must therefore be free from noxious smell and its temperature before removal from the maturation unit must not exceed 40°C, and its temperature must not show any increase when the material is subject to further fermentation tests under optimum conditions.

c - Its granulometry shall be such that 90 per cent by weight of compost as removed from maturation unit will pass through a 40mm square mesh seive. The oversized material is to be re-processed through the plant.

d After Cleaning and refining the compost shall

i - Be free from hard particles and foreign matter of a size which is retained on a 10mm square mesh seive.

ii - Be free from visually detectable glass or ceramic splinters and any particles of such material of a size which will be retained on a 1.5mm square mesh seive.

e. The moisture content of compost before being distributed to users shall not exceed 35 per cent by weight.

f The Nitrogen content must not be less than 0.5 per cent of dry matter by weight.

g The Carbon to Nitrogen Ration(C/N) shall not exceed 24 at any time, but the general acceptable average value will be 20.

h The Ph Value shall not be less than 7 and not greater than 8.

i The level of salinity (sodium chloride) shall not exceed that of the average value for soils in the Damscus area.

j. It shall not contain pathogenic germs or viable plant seeds.

l. The compost shall be graded into two qualities by size:

Medium Compost - Passing a 20mm square mesh seive
Coarse Compost - Passing a 40mm square mesh seive but retained on a 20mm square mesh seive

2. Merchantable Rejects

Any recovered materials from the feedstock shall be sufficiently clean to have a commercial sale value. This particularily applies to recovered metal.