



## ***Section 1***

### ***EXECUTIVE SUMMARY***



## **Section Summary**

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## 1.1 PROJECT PURPOSE

Project purpose is the realization of a petrochemical plant for Linear Alkyl Benzene (LAB) production in Syria, in a site 25 km south of Damascus.

The plant is designed to produce 40,000 tons /year LAB and a minor quantity (4,800 tons/year) of by products (heavy and light alkylates) which can be commercialized.

LAB is the intermediate for tensioactive production, by sulphonation with sulphuric acid.

Several detergents are produced from it: liquid detergents, soaps, and powder detergents in general.

The proponent company (see next paragraph) is the major detergent producer in Syria: it covers Syrian and part of several foreign countries market.

The proponent company is interested in LAB self producing in order to supply detergent production.

About 60% of self-produced LAB will be destined to Syrian sulphonation plants and the remaining 40% will be available for foreign market.

By product light alkylates can be used as fuel (part of them will be used as fuel in the process heaters, inside the site), while heavy alkylates can be used as raw material for producing lubricants or directly as lubricants for machines.



## 1.2 PROPONENT COMPANY

The project is proposed by Ahmad Daaboul & Sons Company for Detergents, a major Company active in Syria and in many other Arabian Countries.

LAB site will be managed by another affiliated company:

DAABOUL CO. FOR PETROCHEMICAL INDUSTRIES

Daaboul & Sons company was established in 1974 under the name “Daaboul Company for Trading and Industry” and since mid 1997 the company has carried its present name, “Ahmad Daaboul & Sons Company for detergents”.

At the beginning, the production was limited to the dishwashing liquid and paste detergent “Modhish”. The paste, in particular, has been a great success and has dominated the local market since then to the extent that Modhish has become a generic name for the paste detergent. In 1979 the company expanded its activities to produce “Topper” the low foam powder detergent for front loading washing machines. Since 1982, the number of qualified technical staff has continually increased and early in 1990, the company started to operate its spray drying tower. Thus, the company has become one of the leading producers of detergents in Syria, and has provided a good share of the demand of the Syrian market for laundry powders, dishwashing paste and cleaning and disinfecting liquids.

In 1993, a new first class laundry powder was launched under the brand name “Friend” whereas Topper was relaunched under the new name “Super Topper” in 1998, and Friend under the name “Friend Power” in 2000.

The production capacity is around 3,5T/hr of powders, 4T/hr of paste and 2,5T/hr of liquid cleaners.

Recently, the company has applied a quality assurance system to the laundry powder plant and has been certified the ISO 9001 from DNV in Norway since 1999. In the same year the company was granted the license to use the sign of conformity on its products from the Syrian Organization of Standards. Moreover, as a result of the key role played by the company in providing quality laundry products, it was awarded the Arabic medal for the best producer of detergents in the Arab world in 1994 and in 2000, as well as the certificate of innovation from the Arab Union for Food Industries in 2000.



In the beginning of 1991 the company concentrated its effort to penetrate the foreign markets and it succeeded. The exports reached about 30% of the total production. The most important export markets are Saudi Arabia, Morocco, Iraq, and Lebanon. The company exports as well, to UAE, Kuwait, Bahrain, Algiers, Libya, some Eastern European countries and Gabon.

The expansion and affiliated companies are:

- Daaboul & Sadat Co. for Sulphochemicals, produces alkylbenzene sulphonic acid. The annual production capacity is 10.000T, 80% of which is consumed by Ahmed Daaboul & Sons Company for detergents.
- Sodium Silicate Plant, produces 7.000T per year of sodium disilicate solution
- Plastic Injection Plant, produces the packages for the paste detergent for the mother company
- Daco Transport Company, with a fleet of 30 light and heavy duty trucks and vans for the delivery of the products of the mother company inside Syria and abroad.



### 1.3 LAB SITE

LAB site is located in South-West part of Syria, in about 25 km south of Damascus (Fig.1.1, 1.2, 1.3), not very far from political borders with *Lebanon* (about 50 km North-West), *Israel* (about 70 km West), *Jordan* (about 80-90 km South).

The chosen site belong to the Municipality of Deir Ali village (1800 inhabitants), in the province of “Damascus country side”.

An important highway crosses Damascus Countryside along direction North-South, connecting Damascus to *Daraa* (near South border with Jordan).

LAB site is located in a plain upland area, about 700m above sea level, situated between two main mountain groups (*Jabal Maan*, in the North-East, 3 km minimum distance from site, and *Tell Salalem* and *Jabal Aba* , in the South-West, 1.5 km minimum distance from site).

Height values above sea level in the LAB site plain are slightly decreasing form North to South.

Hydrographically, the area is located inside Barada basin. Barada is the river flowing in Damascus city. No river with regular flow are present near the site.

The most significant infrastructures and built-up areas near LAB site are the following ones:

- Village Deir Ali: about 2 Km North-East
- Highway Daraa-Damascus: 400m West
- Road type 3<sup>a</sup> near village Deir Ali: 1,7 Km North-East
- Railway Damascus-Daraa: about 1,5Km East.

Another village is located about 5 km South of the site.

No industrial structures are already present in the site, expect for a ceramic factory, 700 meters far in north direction. A house with a small cultivated area is present on the South side (250 meters far).

<sup>a</sup> In Syria four roads classification level are present; Road 1 is first class



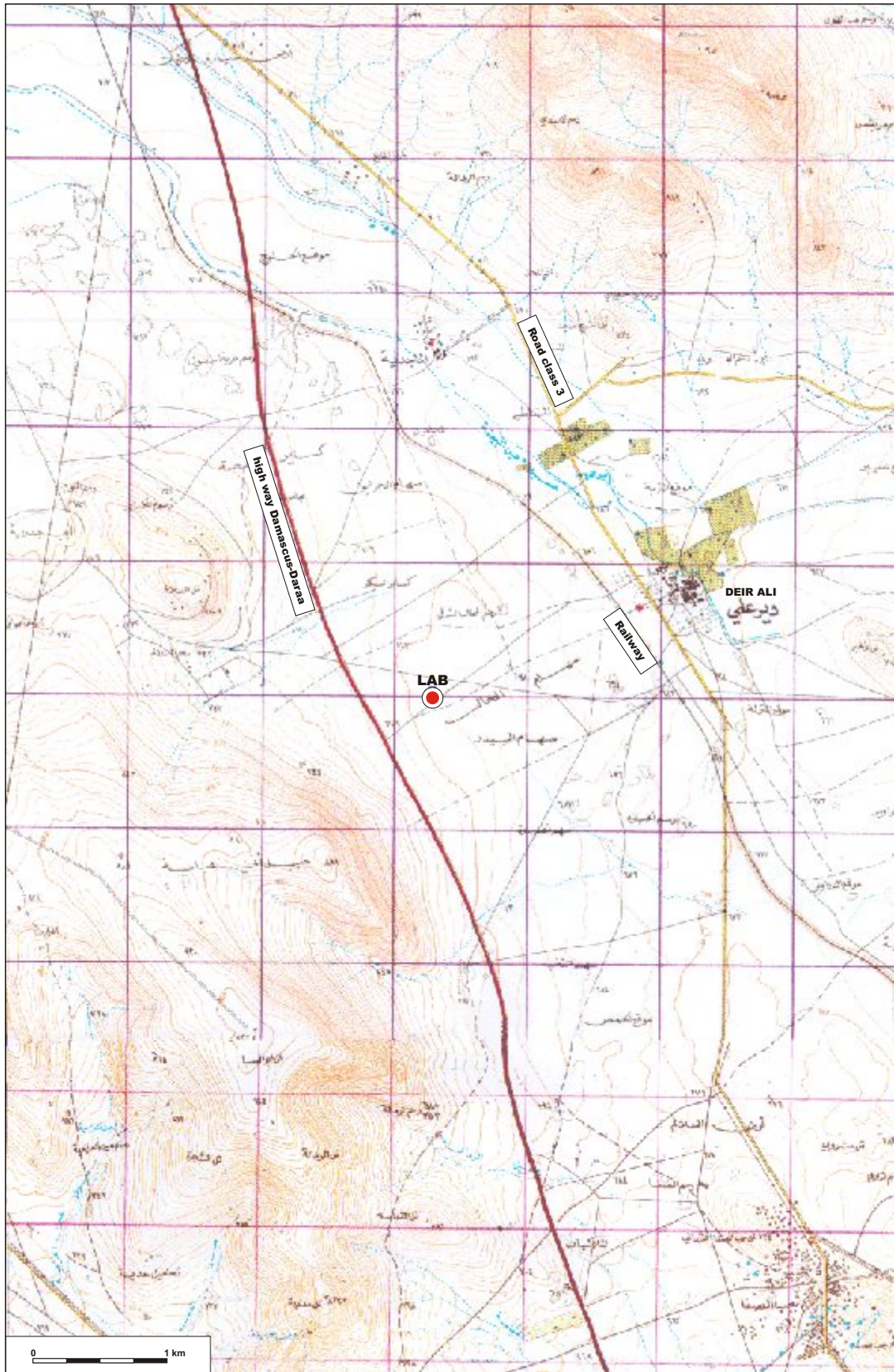
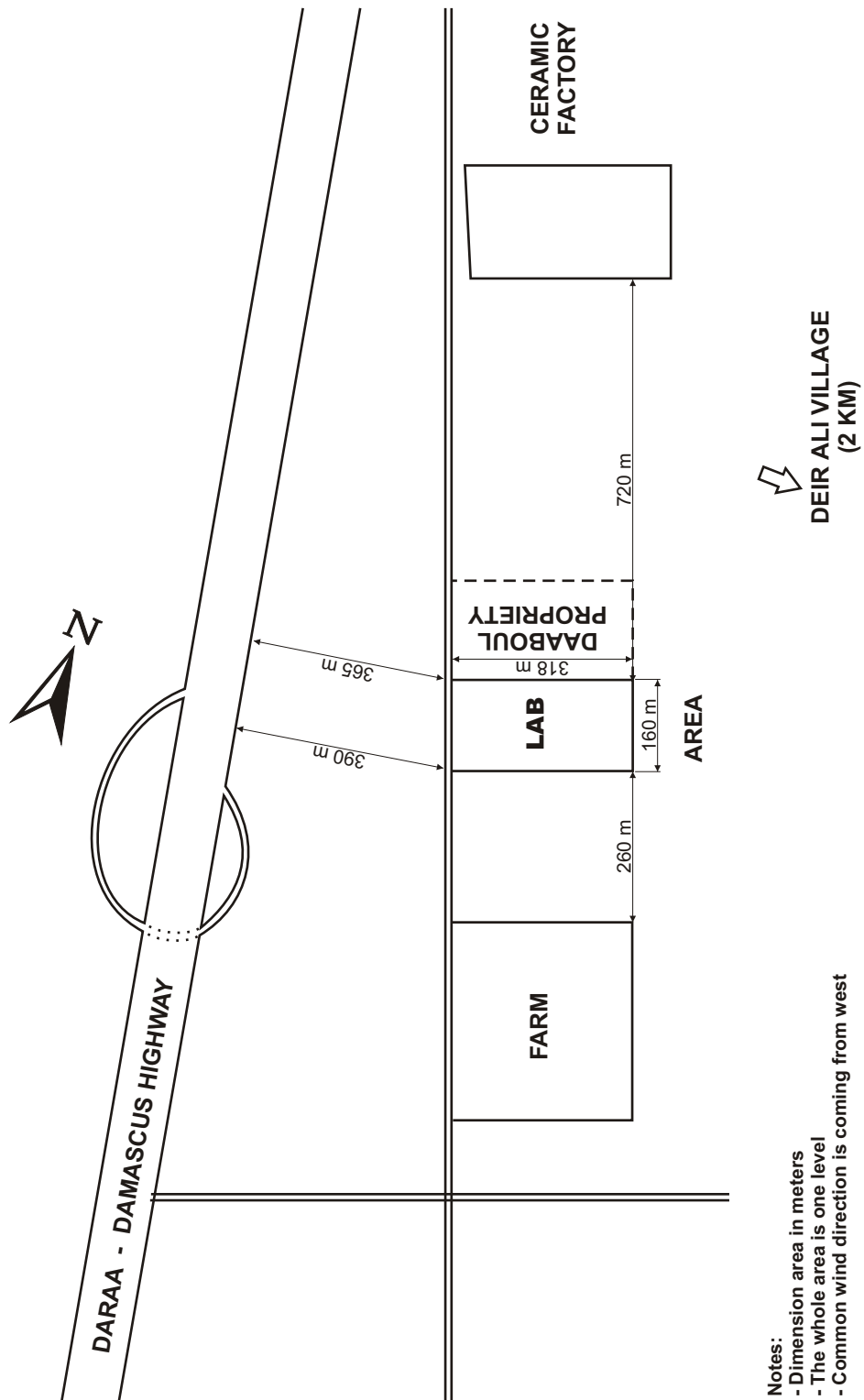


Fig. 1.2: Site location in the area of study



- Notes:
- Dimension area in meters
  - The whole area is one level
  - Common wind direction is coming from west

Fig. 1.3: Area around the site: present structures and infrastructures



## 1.4 PLANT HISTORY

LAB project is a “greenfield” one: the land chosen for the site is not used at the moment.

The Proponent has purchased an existing LAB plant in Yambol City (Bulgaria) in order to have it dismantled, reconditioned and re-assembled in Syria. The Plant, described more in detail in the following, includes the process units and the relevant facilities.

The Plant’s process units basic design and license were provided by UOP, while the detailed engineering was originally made in Bulgaria where the previous LAB project was done. The main equipment, machinery, instrumentation, accessories were originally manufactured / sourced in Bulgaria and Western Europe.

The Bulgaria plant construction started in 1984 but was never brought to completion, as works were stopped in 1991 and the plant was therefore never put into operation.

During the dismantling activities, performed between 2000 and 2001, an UOP survey has been carried out to assess the general conditions of the Bulgarian Plant’s equipment (mainly vessel, columns and heat exchangers).

The original Bulgarian Plant’s engineering documentation, was completely re-ordered, checked and classified.

All available process area, basic & detail engineering documentation, equipment drawings, have been collected to the Site from Ballestra offices, properly packed and marked by Ballestra. Ballestra has provided the Basic design engineering documents for “off sites” units (tank farm and utilities units), which includes the following documents: P&I drawings, equipment specifications, instrument specifications, lay out.

The detailed engineering documents for off sites units (utilities and tank farm units) have been provided by two third Companies. INCO, a Turkish engineering company, provided piping and structures detailed documents, while ELTECH, an Italian one, provided all the electric and instruments specifications and diagrams. The construction drawings of the new equipment has been provided directly by the relevant constructors. During the re-erection works Ballestra is supervising all the activities: a dedicated Ballestra Site Manager is continuously present at Site in order to give instructions when necessary, to assist and to report to the Project Manager, issue the project status reports and to collect all information to all parties in this project.



## 1.5 PROJECT DESCRIPTION

The HF Detergent Alkylation Process is a catalytic process to alkylate benzene with linear olefins to form linear alkylbenzene. The linear alkylbenzenes produced from the C<sub>10</sub>-C<sub>13</sub> linear olefins are useful detergent intermediates and can be readily sulfonated to yield linear alkylbenzene sulfonates. These compounds constitute the active ingredients of many household detergents.

The process is based on two main reactions:

- paraffin dehydrogenation and conversion to olefins (PACOL)
- benzene alkylation with linear olefins, in order to obtain Linear Alkyl Benzene (LAB).

The principal raw materials are paraffins and benzene, the principal product is Linear Alkyl Benzene. By-products are light gases (hydrogen, light hydrocarbons), alkylate polymers and heavy alkylates.

Catalysts are used in both reactions: Palladium on Alumina pellets in Pacol unit and Hydrofluoric Acid in the Alkylation unit.

The following flow diagram (**Fig.1.4**) shows main process blocks:

- Paraffin pre-treatment (Oxygen stripping unit)
- Paraffin conversion to olefins (PACOL unit)
- Benzene alkylation with linear olefins (HF alkylation unit)
- Raw materials, products and by-products storage (Tank farm)

In order to provide heat for reagents (to reach reaction temperature) and for vapor production in the distillation columns, a Hot oil unit and a specific charge heater in Pacol unit are present. Fuel oil is the main fuel, but also a low quantity of process by products from PACOL unit (light ends) and from Lab unit (heavy polymers) are burnt.

Plant area is divided into two main parts:

- the process area;
- the “off-site” area (outside the process area)

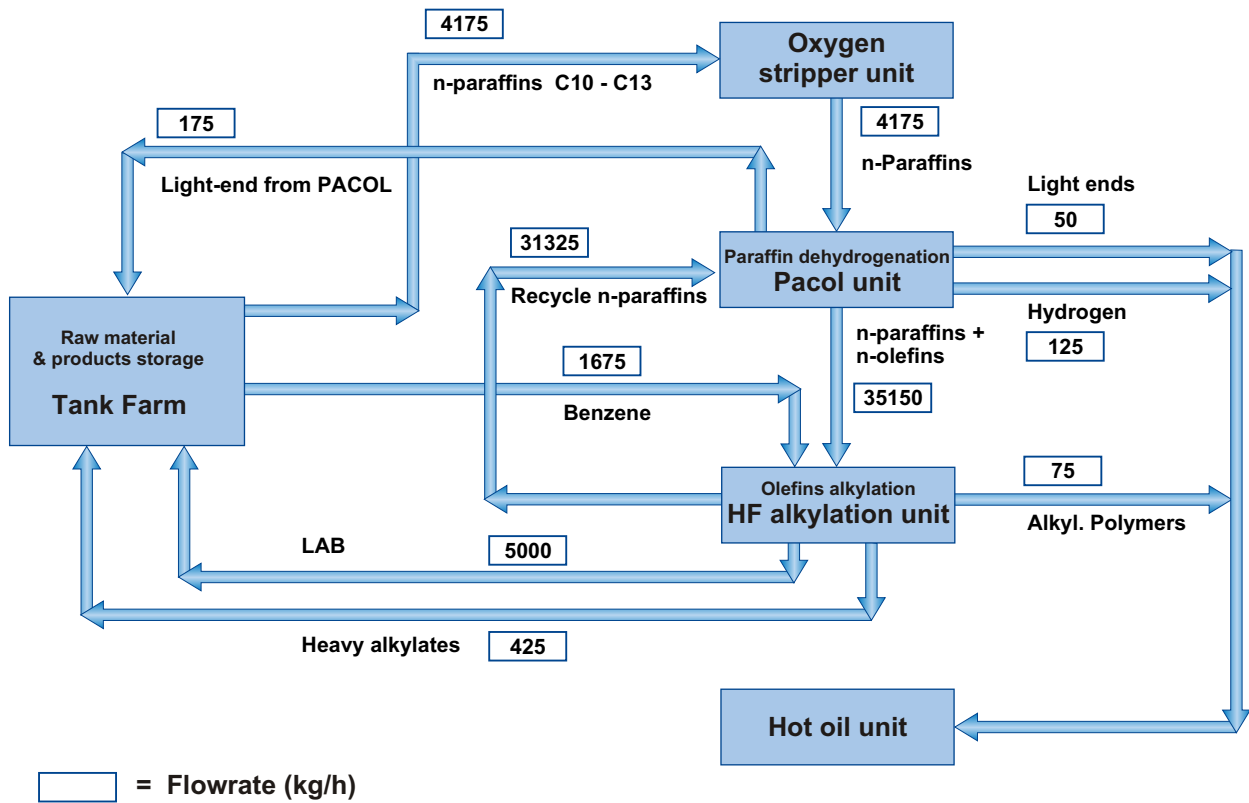


Fig. 1.4: Global Block Diagram



Process units and auxiliary systems are located in the “process area”. The off-site facilities (Tank Farm unit and utilities units) are located outside the process area (with the exception of the Steam boiler unit) and connected to the process units through an interconnecting system.

The overall LAB Plant is composed of:

- Process units installed in the “process area” .
- Other units installed in the “process area”.
- Tank Farm unit located out-side the “process area”.
- Utilities units located out-side the “process areas (with the exception of steam boiler unit).



## 1.6 SITE AND PROJECT ALTERNATIVES

### SITE ALTERNATIVES

LAB localization in present site was identified after examining and eliminating another site choice.

The site previously examined was situated next to existing Daaboul Sulfonation plant (final destination of LAB). The advantages of this site was the good integration between the existing and the new plant.

However, the previous choice was not good for two main reasons, evidenced by Ballestra technicians:

- the site was too near to inhabited centres and next to a big supermarket;
- the site morphology was not good for a chemical plant (it was not perfectly plain, giving rise to a much more complex project and to difficulties in trucks access and movements).

LAB site final choice is good for:

- distance from towns (Deir Ali is 2.0 km distant)
- the almost desertic features of the area.

### PROCESS ALTERNATIVES

HF technology, adopted in Syria plant, is very well known and several large industrial plants are in operation since many years in different countries. The HF technology is still the most widely applied to produce LAB (almost 80% of the total LAB worldwide produced).

Two other different technologies are currently available in order to produce LAB:

-AlCl<sub>3</sub> technology

-Detal process technology.

AlCl<sub>3</sub> technology is very similar to HF technology. AlCl<sub>3</sub> is much less hazardous than HF, but, being used in aqueous solution, is highly corrosive, giving rise to many maintenance problems; moreover a recovery of the catalyst used is not possible and large quantities of Aluminum Hydroxide are produced (it could be used as flocculant agent, after appropriate treatment).

Detal process technology is a state of the art process for the manufacture of detergent



alkylate that uses a solid heterogeneous catalyst to produce Linear Alkylbenzene by the direct alkylation of benzene and Linear olefins. This technology has the fundamental advantage of eliminating HF or  $AlCl_3$  corrosive liquids.

The choice of HF technology for Syria plant was essentially due to the chance of recovering an existing not operating plant with a high production capacity. This choice permits to completely satisfy Daaboul sulfonation plant LAB needs and to provide more LAB in the Arabic market, substituting a significant quantity (about 20,000 tons/year) currently imported from external Countries.



## 1.7 PREVENTION AND MITIGATION MEASURES

In the present paragraph a brief description of main prevention and mitigation measures is reported.

### SAFETY

The project has been analysed with a particular methodology, called HazOp (Hazard Operability analysis) whose purpose is, first of all, identifying potential process hazards or operability concerns and then indicating measures finalized to increase plant reliability and to reduce the potential consequences of an incident.

Main issues outcoming from HazOp analysis applied to LAB site concern improvements in the following main items:

- Isolation of equipments, by introducing new valves and procedures to pump out the mixture in case of emergency, in order to reduce the duration of an accidental release.
- Detection of accidental acid leakages and flammable gases.
- Fire detection and structure fire proofing.
- Paving and sewer system in process areas, storage tank containment dikes and curbs, in order to avoid soil contamination in case of accidental leakages.
- Control systems, with regards to Control room protection and control systems redundancy.

Daaboul Lab will implement all recommendations from HazOp, and will use the HazOp results for accident probability and consequence calculations. All accidents with probability higher than  $10^{-6}$  will be included in the emergency Response Plan

For hygiene and safety operation a training program for personnel is in elaboration. All the necessary personal protective equipment will be available for operative personnel, who will be trained on its use.

### ENVIRONMENT

Soil contamination is prevented by the presence of pavements in process areas, that will permit to collect eventual leakages. Storage tank containment dikes will be



dimensioned in order to contain the hold up of the largest tank.

Air emissions are mainly due to fuel oil combustion in furnaces. Air pollutant emission will be limited by choice of low sulphur (1%) fuel oil, as far as possible considering its availability in Syria.

Benzene emissions from storage tanks is limited adopting an internal floating roof with external fixed roof. Benzene concentration monitoring in different points inside the plant and at its fence is foreseen. Particular care will be given in the management system to water use and saving.

Noise emissions from power generators (which are the most noisy equipments) is limited by a closed building.

In waste water sewerage, separation between possibly acid contaminated liquids and possibly oily contaminated liquids is foreseen. Two different treatments are provided: a neutralization treatment, for acid liquids, and an oil separation, for oily liquids.

Industrial waste water from companies located around Damascus are typically piped or trucked to the municipal waste water treatment plant. Daaboul LAB's original permit was based on this. Due to the amounts of waste water to be trucked (up to 15 cubicmeters per hour), the distance of the transport (30-40 kilometers), as well as the relative low contamination level of the waste water, it was in early February 2002 decided to design and build a full waste water treatment plant on-site.

The waste water treated in the on-site plant will comply with World Bank guidelines and will be used for irrigation of new green areas within Daaboul's own premises, and/or for outside irrigations projects according to permits obtained.

The design and construction of the waste water treatment plant is delayed according to the LAB plant implementation schedule and it might, in an interim period during the commissioning, be necessary to use the municipal waste water treatment system.

## **MANAGEMENT MEASURES**

### Preparedness and response to emergency

Fire fighting system, described in detail in sec.3.5, is composed by a series of properly sized equipment which are able to detect possible flammable gas mixture presence or fire presence and then to guarantee water sprinkling/distribution for at least 2 hours in the area involved.



An emergency plan will be defined before plant start up. A group of internal operator will be trained for fire fighting and first aid. Appropriate training for emergency behaviour will be provided for all personnel.

#### Inspection and Maintenance

On the base of previous experiences, a general stop of the plant for maintenance is foreseen every 2-3 years.

An inspection program will describe the typology and frequency of controls, with particular attention to control of lines and equipment containing acid liquid or gases, in order to verify possible corrosion effects reducing material thickness.

In Operating Manuals a list of critical lines and equipment and detailed procedures for their control will be present.

The general maintenance will be committed to specialized external companies, managed by the internal responsible for maintenance. Everyday maintenance interventions (like catalysts substitutions, instrument cleaning and so on) for which actual plant stop is not required, will be made by internal maintenance staff.



## 1.8 PROJECT INTERFERENCE WITH ENVIRONMENT

A synthetic summary of main project interferences with environment is reported.

Environmental Factor/Component	Main Project Interference with Environment	Note
<b>Air</b>	Air emissions from fuel oil combustion (non process units): (Hot oil unit, Pacol charge heaters, steam boiler burners, power generators). Minor contributions due LPG and waste gases combustion in flare. Minor contributions from traffic from and towards the site (about 15-20 trucks/day). Air emissions from process units:	Principal emissions concerne: SO <sub>2</sub> 1,700 mg/Nm <sup>3</sup> NO <sub>x</sub> 460 mg/Nm <sup>3</sup> CO 50 mg/Nm <sup>3</sup> (*) PTS 100 mg/Nm <sup>3</sup> (**).  SO <sub>2</sub> 500 mg/Nm <sup>3</sup> NO <sub>x</sub> 300 mg/Nm <sup>3</sup> PTS 20 mg/Nm <sup>3</sup>
	Organic substances evaporation losses from tanks	Fuel oil 170 kg/year Diesel oil 70 kg/year Paraffins 500 kg/year Benzene 820 kg/year Off-specific 350 kg/year
<b>Water</b>	Groundwater use mainly for cooling towers and demineralisation operations (evaporation and blowdown losses).	24 m <sup>3</sup> /hour - 190,000 m <sup>3</sup> /year
	Wastewater treatment complying to World Bank guideline standard will be performed in the site, in order to recover water for irrigation (in an interim period it might be necessary to use the municipal waste water plant).	15 m <sup>3</sup> /hour - 120,000 m <sup>3</sup> /year Treated waste water will be used for irrigation.
<b>Waste production</b>	Calcium Fluoride sludge production (from neutralization basins). It could be recovered in external factories. Exhausted catalysts can be completely recovered by the Suppliers.	10 – 35 m <sup>3</sup> /month
<b>Noise</b>	Noise emissions from some equipments (compressors, furnaces, power generators). Minor contributions from traffic from and towards the site (about 15-20 trucks/day).	Higher emission values (pressure levels at 1 m distance): 90 dB(A) for power generators (outside their closed building) 85 dB(A) for the other equipments.

(\*): 25 mg/Nm<sup>3</sup> for power generators      (\*\*): 2 mg/Nm<sup>3</sup> for power generators



## **1.9 ENVIRONMENTAL ISSUES IN SYRIA AND IN THE AREA OF STUDY**

### **1.9.1 Syrian environmental overview**

An overview study of the Syrian environmental situation was carried out based on available country wide studies. This study is available in the main report, section 2, and has given support for the detailed local environmental study.

### **1.9.2 Environmental issues in area of study**

The most relevant air pollutant source in the area is the traffic in the highway.

Prevailing winds come from West-NorthWest, with mean monthly speed between 2 and 4.5 m/s (statistical elaborations of data in the period 1951-1994). Mean annual temperature is 16 °C, annual precipitation is 167 mm.

No river with regular flow is present in the area.

The area is not provided with public water distribution system nor with sewer system. Water requirements are satisfied by groundwater supplying.

Hydrogeological studies conducted in LAB site and more general information on the area show that the water bearing formation is composed of basalt; the main groundwater direction is approximately from North to South.

A series of wells around Deir Ali are visible (North-East and South of the village), in zones devoted to agriculture and other wide areas with agriculture activities and a number of wells are about 6-7 km North-West of LAB site, in the zone of Al Kiswah, and 25 km North, in Damascus outskirts.

As for air emissions, also for noise emissions the highway traffic is to be considered the main source in the area.

A summary of environmental present status is reported in the following table.

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\* [1] "State of the Environment Report", Syrian Arab Republic, UNEP, 1986, see **Annex II.1**

\*[2] "Sanitary map in Syria", Syrian Arab Republic, Ministry of Environment, Damascus, October 2000, see **Annex IV.3**



*Main issues concerning environmental present status*

<b>Environmental Factor/ Component</b>	<b>Present status</b>	<b>Note</b>
<i>Air</i>	Main air emission source is presumably traffic along the highway.  Minor emissions from the ceramic factory.	Traffic pollutant influence can be considered mainly limited to some hundred meters around the road.
<i>Water</i>	No river are present.  Water supply comes from groundwater wells.  Five wells are present in LAB site and Daaboul propriety	Principal groundwater quality parameters:  Conductivity 700 $\mu$ S/cm  Total hardness 11 °F
<i>Land</i>	Land use in the area is limited to small inhabited areas (Deir Ali) and isolated houses. Some cultivated zones are present (farm near the site, areas north-east of Deir Ali).  No previous use for LAB site is documented and the land was brought from a private owner.	---
<i>Soil and Subsoil</i>	Thin soil layer (red brown clayey layer), with underlying compact basaltic rocks and cracked basaltic rocks.	
<i>Noise</i>	Noise emissions come mainly from traffic along the highway	About 80 dB(A) near the highway, about 60 dB(A) near the site and the farm
<i>Landscape</i>	The area is a plain, rocky desert one, among two main mountains groups.  Small, isolated buildings are present.  About 700 meters from LAB site a ceramic factory is present.	---
<i>Flora and Fauna, Ecosystems</i>	In all the region changes in vegetation typologies are in progress, due to desert areas expansion from East to West.  Neither particular autochthonous species, both vegetation, flora and fauna, nor ecosystems were identified in the area	---



## 1.10 ENVIRONMENTAL IMPACT PARAMETERS

### AIR

Air emissions are mainly due to:

- Fuel oil combustion in Hot oil unit, Pacol charge heaters, Steam boiler burners, power generators (diesel oil).

Minor contributions are due to:

- Evaporation losses from tankfarm.
- LPG and waste gases combustion in flare.
- Traffic from and towards the site (about 15-20 trucks/day).

On the base of emission values from stacks and tankfarm, assessment of main effects on air quality has been performed by applying a mathematical model in order to calculate the expected pollutant concentrations at soil level.

Considering the main prevailing wind direction (WNW) Deir Ali village is not impacted by pollutant dispersions (see following example maps for SO<sub>2</sub>, **Fig.1.5, Fig.1.6**).

Values in the range 1-10 µg/m<sup>3</sup> or less of SO<sub>2</sub>, the major pollutant, can be estimated in correspondence of farms, south of LAB site .

Taking into account eventual different directions wind that could increase the effects on Deir Ali the values should be of magnitude 10-30 µg/ m<sup>3</sup>. The concentration values are lower than reference air quality values.

In this situation no significant interference or sum with other present effects (highway air pollutant emissions), that can lead to concentration values higher than reference values, should occur.

### WATER

#### Water supplying

surface water is available in the area. All the water needs are supplied by groundwater.

For LAB site water consumption is equal to 24 m<sup>3</sup>/hour (maximum), which will be supplied by five wells inside Daaboul propriety.

Remembering that main groundwater flow direction in the area is approximately from North to South, LAB site supplying should not interfere with main wells supplying

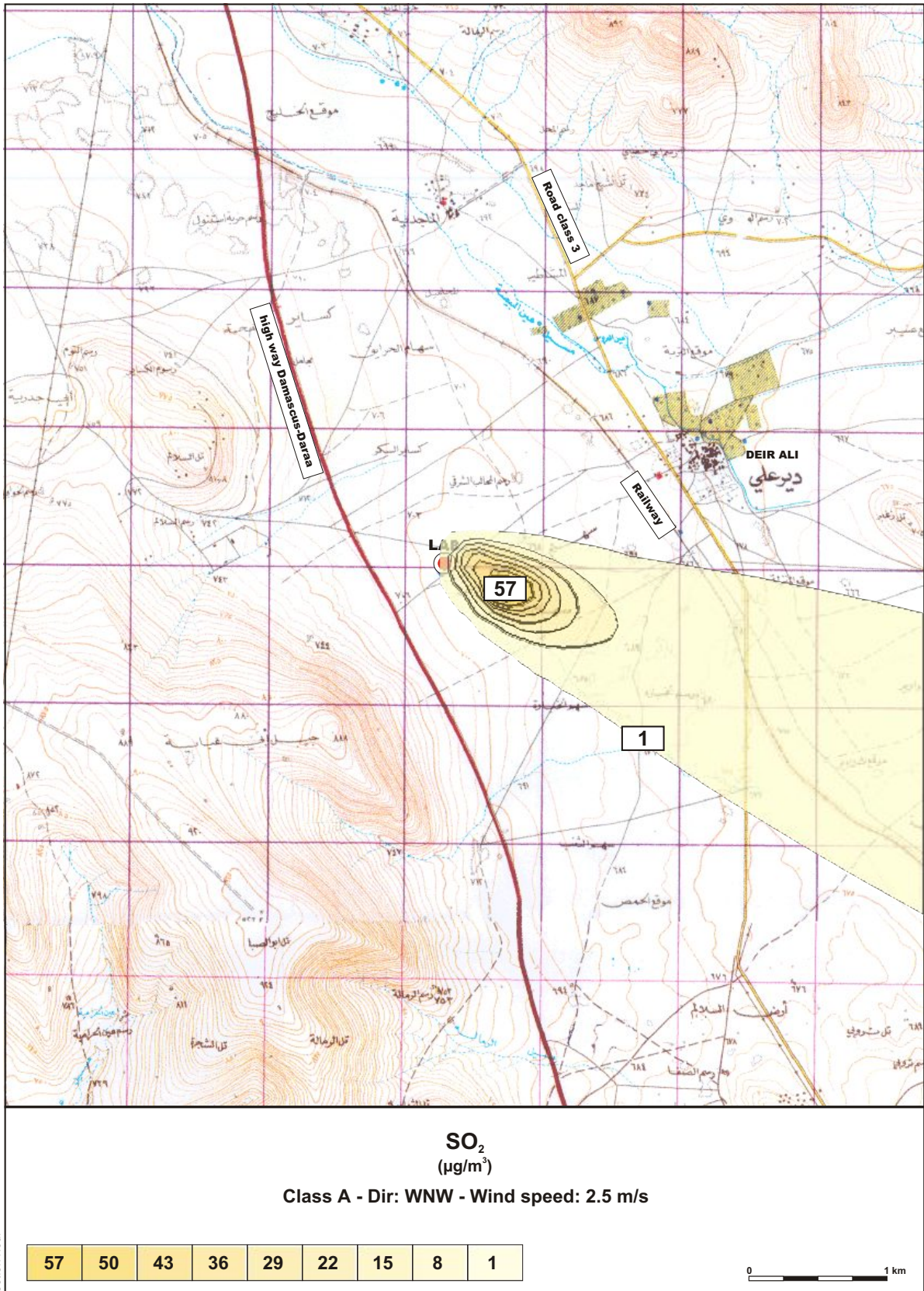


Fig. 1.5: Pollutant dispersion maps

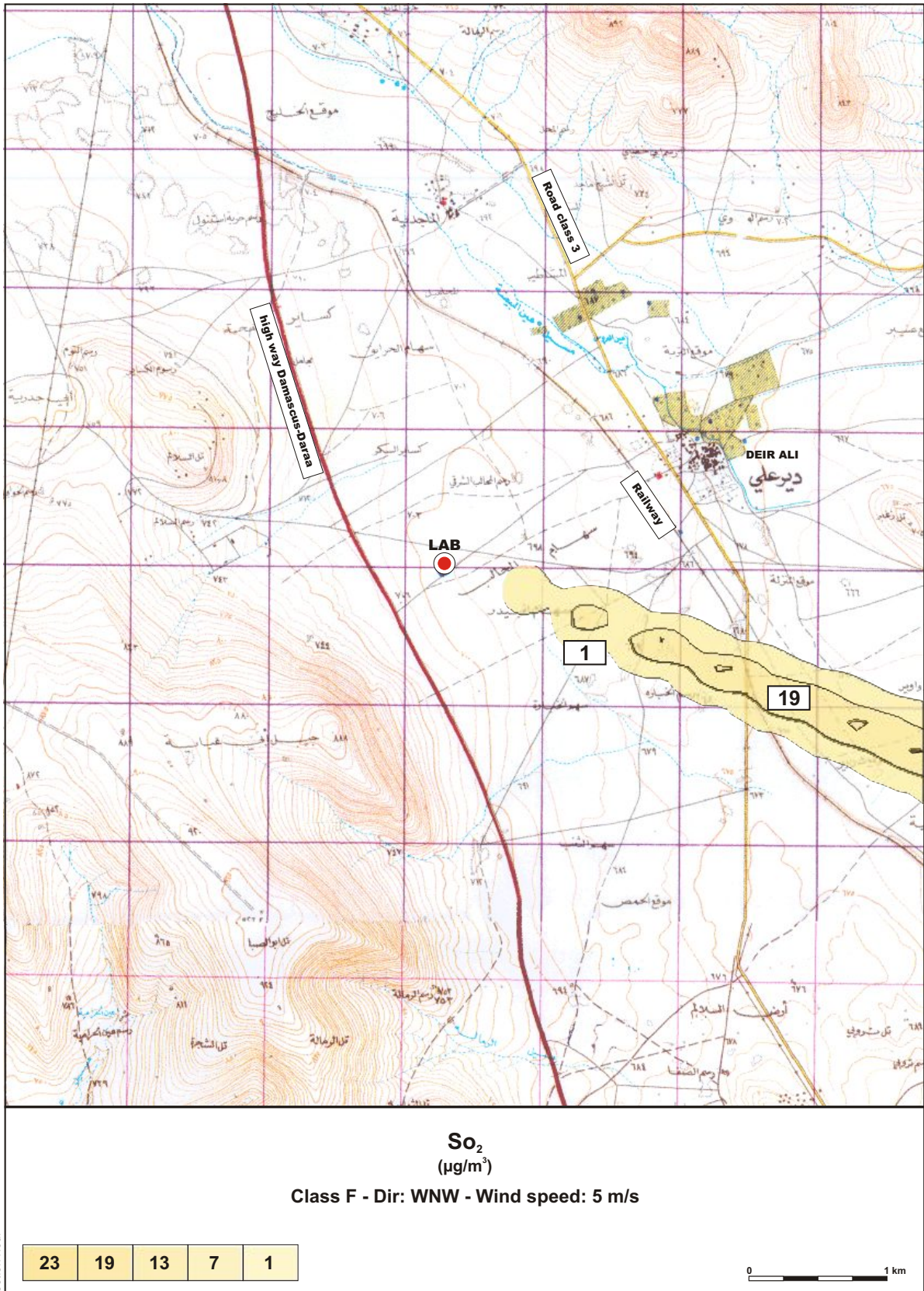


Fig. 1.6: Pollutant dispersion maps



present in the area.

### Waste water

A comprehensive wastewater treatment plant will be designed and built on-site.

The waste water treated in the on-site plant will comply with World Bank guidelines and will be used for irrigation of new green areas within Daaboul's own premises, and/or for outside irrigations projects according to permits obtained.

The design and construction of the waste water treatment plant is delayed according to the LAB plant implementation schedule and it might, in an interim period during the commissioning, be necessary to use the municipal waste water treatment system.

### **LAND**

LAB project will occupy about 50,800 m<sup>2</sup>. No previous use of LAB site is documented.

Soil and subsoil will be protected from contamination due to eventual leakages of hazardous materials by paving process areas and providing tankfarm with paved dikes and curbes.

### **NOISE**

A mathematical model has been applied in order to evaluate noise diffusion from the main sources, located inside LAB site, toward the surrounding area.

The most noisy sources are power generator, steam boiler and compressors.

Modelling application led to the following results, illustrated in a map (**Fig.1.7**) where equal sound pressure level (Lep) ranges are reported in different colours:

- the highest values are obtained in front of the power generator building (North side), with Lep of about 65 dB(A) and a maximum value of 70 dB(A); values are rapidly decreasing, along north side, with increasing distance from that building, up to under 60 dB(A) near the North-East corner;
- along East side the maximum value is 57 dB(A), along South side the maximum value is about 55 dB(A), along the East side values rang from 55 to 70 (again near power generator building);
- Lep near the *receptors* is approximately 30 dB(A).

Comparison with existing situation shows that with plant operating no sensible differences in noise levels, due to continuous sources, should be present. In fact noise



from existing sources (highway traffic) is estimated in about 60 dB(A) at the receptors.

### **LANDSCAPE**

The new plant, even if it is a 'greenfield' one, is not the first industrial structure in the area.

Its visibility is mainly limited to the immediate surroundings, being the area plain for a long extension along North-South direction and for 1.5-2 kilometres from the site along East-West direction.

Existing landscape don't present features of particular value which can be disturbed by the new plant introduction.

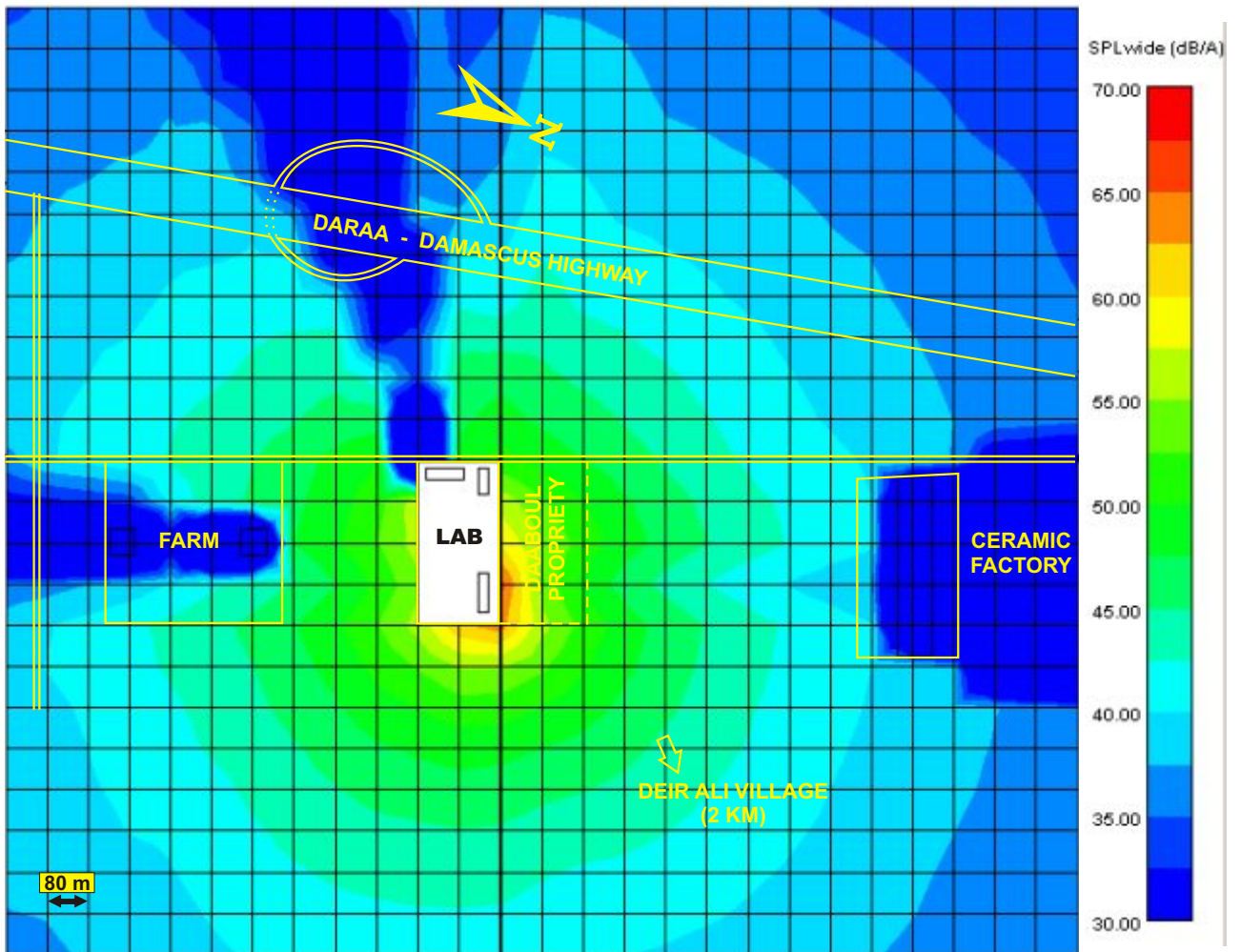


Fig. 1.7: Sound pressure lines in dBA



## 1.11 ENVIRONMENTAL IMPACT SUMMARY

In the following table main issues of environmental impact assessment are summarized.

Environmental Factor/ Component	Main Project Interference with Environment	Notes on Impacts
<b>Air</b>	<p>Air emissions from fuel oil combustion.</p> <p>Organic substances evaporation losses from tanks.</p> <p>Minor contributions due LPG and waste gases combustion in flare.</p> <p>Minor contributions from traffic from and towards the site (about 15-20 trucks/day).</p>	<p>Increase of pollutant emissions in the area.</p> <p>Pollutant concentrations at soil level due to new emissions from main sources (stacks, tankfarm) will be lower than the following:</p> <p>Syrian guideline values:            SO<sub>2</sub> &lt; 125 µg/m<sup>3</sup> (24 hours)                      &lt; 50 µg/m<sup>3</sup> (1 year)            NO<sub>2</sub> &lt; 150 µg/m<sup>3</sup> (24 hours)                      &lt; 400 µg/m<sup>3</sup> (1 year)            CO &lt; 10 mg/m<sup>3</sup> (8 hours),            European limit for Benzene:                      &lt; 10 µg/m<sup>3</sup> (1 year)            and World Bank guidelines:            T.S.P &lt; 70 µg/m<sup>3</sup> (24 hours)            PM<sub>10</sub> &lt; 50 µg/m<sup>3</sup> (24 hours).</p>
<b>Water</b>	<p>Groundwater use mainly for cooling towers and demineralisation operations.</p>	<p>Increase in groundwater use.</p> <p>Main groundwater flow direction in the area is approximately from North to South; LAB site supplying should not interfere with main wells supplying already present in the area (Deir Ali, Al Kissweh)</p>
	<p>Waste water discharges</p>	<p>A comprehensive wastewater treatment plant will be built on-site. The wastewater treated in the on-site plant will comply with World Bank guidelines and will be used for irrigation of new green areas within Daaboul's own premises, and/or for outside irrigations projects according to permits obtained.</p>



<b>Environmental Factor/ Component</b>	<b>Main Project Interference with Environment</b>	<b>Notes on Impacts</b>
<b>Waste production</b>	Calcium Fluoride sludge production (from neutralization basins). It could be recovered in external factories.  Exhausted catalysts can be completely recovered by the Suppliers.	No impact in disposal plant if a complete waste recovery is done.
<b>Noise</b>	Noise emissions from some equipments (compressors, furnaces, power generators).  Minor contributions from traffic from and towards the site (about 15-20 trucks/day).	No sensible noise impact is expected at receptors (farms, ceramic factory) nearest to LAB site.
<b>Land use Soil and Subsoil</b>	Occupation of about 50,800 m <sup>2</sup> .  Incidental leakages are collected by pavements and sewer networks in process area.  In tankfarm, paved dikes and curbs are provided for incidental leakages containment.	No previous use of the site is documented.  Soil contamination is prevented by adequate soil paving and proper operation.
<b>Landscape</b>	The plant is a greenfield one.  Next to it another industrial plant is already present.	Existing landscape don't present features of particular value which can be disturbed by the new plant introduction.  Its visibility is mainly limited to the immediate surroundings.
<b>Flora and Fauna, Ecosystems</b>	The site area is a rocky debris one. No vegetal associations or fauna species are present.	No impact is expected.



## 1.12 MANAGEMENT SYSTEM

LAB project introduces a kind of plant and technology not currently present in Syria. The new initiative requires that adequate training and preparedness are put in place in order to get personnel adequate professional level and awareness of health, safety and environment (HSE) matters.

Daaboul Company has recently got experienced in applying a quality assurance system to one of its plants, being certified ISO 9001 in 1999. On the base of this first experience, the Company intends to apply principles of good management also to the new LAB site, with particular attention to HSE matters.

Before plant commissioning and start-up, the fundamental elements of HSE management systems will be defined, in order to implement adequate training activities and elaborating or reviewing the necessary documentation.

The fundamental elements that will be developed are:

- 1 Organization and personnel tasks, with particular reference to HSE matters
- 2 Safety procedures
- 3 Operating manuals
- 4 Emergency response and preparedness
- 5 Periodical review of management practices

Detailed training and HSE monitoring plan will be developed in the next months.

Training plan will concern both professional and HSE training and will be implement before plant commissioning and start.up.

HSE monitoring plan will be developed considering the following main items:

1. Hazardous substances (mainly Benzene, HF, VOC)
2. Noise (inside the plant and at the fence)
3. Fuel combustion (air emission at main stacks and air quality in the area surrounding the site)
4. Water use and discharge (water consumption and discharge parameters).



### 1.13 PUBLIC CONSULTATION

The Daaboul LAB project has followed an approach to public consultation taking into account Syria's own cultural characteristics. This has included an announcement of the planned project in the following newspapers:

Althawraa Jan,14,2001

Alhayat Feb,05,2001

Teshreen Sept,26,2001

These announcements included descriptions of the project, project capacity, the output of the project, how many job opportunity will be created by this project, the total investment required to finish this project, the location of the project, raw materials used to produce LAB, finished products application, project influence on the economic situation in Syria.

A public presentation on the project and its impacts occurred at the local Council of Deir Ali Municipality on December 4th, 2001 when the current draft Environmental Impact Assessment was being finalized.

This meeting was attended by four members of the council, leaders and members of distinction from Deir Ali village, as well as presenters from Daaboul LAB.

To fulfill IFC's public consultation and disclosure requirements the EIA report will be released in Washington DC (in English language) via the World Bank InfoShop and locally in Arabic language (the report will be disclosed at the following locations: Deir Ali Municipality, the Ministry of Environment).

This report will be available locally and in the InfoShop for a period of at least 60-days prior to IFC's Board consideration of the proposed project.

The local release will be announced in the most popular local newspapers, including one in Damascus, with a short description of the project, the EIA's availability, how one may send comments or questions of concern, and an announcement of specific times and places where Daaboul representatives can be met for further commenting and discussions regarding specific concerns or suggestions. Minutes with questions and answers from these availability occasions will be made available to the public together with the EIA and will be forwarded to IFC at the end of the sixty day public dissemination period.