



## editorial

Nous vivons tous sur la même planète et faisons partie de la même biosphère. Nous reconnaissons maintenant que nous sommes dans une situation d'interdépendance croissante et que notre avenir est indissociable de la préservation des systèmes de maintien de la vie sur l'ensemble du globe et de la perpétuation de toutes les formes de vie.

Dans une économie mondiale fondée sur les connaissances, l'innovation est essentielle, l'accès à l'autoroute de l'information, aux réseaux de haute technologie et aux universités crée un milieu favorable à l'innovation.

La différence entre le sous-développement et le développement c'est le Savoir. Les Pays Nouvellement Industrialisés d'Asie (PNIA) ont pu, grâce à des politiques impulsées par le savoir et l'innovation, atteindre un niveau de développement appréciable. Le développement a besoin qu'on veille au transfert du produit issu de la recherche dans les processus de production. Or, dans nos pays en développement, il arrive que les

quelques découvertes qui s'y font ne soient pas exploitées sur le terrain. Autrement dit, nous trouvons souvent des moyens pour mener à bien des recherches et même des projets-pilotes; mais une fois qu'on les a conduits avec succès à leur terme, quand il ne reste plus qu'à en faire le transfert sur une grande échelle, le système est bloqué. Dans certains cas, d'autres pays diffusent à leur propre bénéfice des résultats de recherche obtenus chez nous.

Les pays leaders sont caractérisés par la célérité avec laquelle ils valorisent les résultats de la recherche. "Leur allure est déterminée, écrit Alvin Toffler dans son livre "Les Nouveaux Pouvoirs", par la vitesse des transactions, le temps nécessaire à la prise des décisions, le rythme auquel les idées nouvelles sortent des laboratoires, la vitesse à laquelle elles arrivent sur le marché et, par-dessus tout, la rapidité avec laquelle les données, l'information et le savoir parcourent le système économique".

La recherche et le développement technologique, ainsi que l'éducation et l'enseignement jouent un rôle capital dans la réduction des disparités économiques entre les pays.

de l'innovation par la mise en place de réseaux de soutien à l'innovation et la promotion de "success stories";

- Diffusion des nouvelles technologies et techniques auprès d'entreprises de différents secteurs en encourageant la coopération entre chercheurs, industriels et investisseurs;

- Renforcement du niveau de qualification de la main d'œuvre par une formation professionnelle adaptée; sans oublier que les investisseurs qui abordent un pays s'assurent par-dessus tout de l'existence sur place d'une main d'œuvre qualifiée et abondante; d'où la nécessité d'une formation professionnelle massive dans les métiers d'avenir.

Pour cela, nous devons créer des centres d'excellence, des réseaux dans lesquels les chercheurs seront impliqués et qui réunissent les conditions favorables à la circulation de l'information scientifique et technique. De tels réseaux sont propices à la veille technologique: les uns et les autres pourront épier les nouveautés, se tenir au courant des recherches qui sont effectuées partout dans le monde, échanger et s'enrichir mutuellement.

Le savoir scientifique a engendré des innovations remarquables qui ont été très bénéfiques pour le genre humain.

Enfin n'oublions pas qu'avec la concurrence toujours plus vive qui est maintenant de règle dans l'économie mondiale, l'occasion que l'on ne saisis pas n'est jamais perdue. Elle est saisie par quelqu'un d'autre.

B. F.

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L'importance croissante des investissements et la constitution de réseaux liés, ont permis, dans la plupart des pays industrialisés, de réaliser cette conjonction entre le chercheur, l'ingénieur et l'entrepreneur. Elles pourraient être stimulées, dans les PVD, par les initiatives suivantes:

- Développement d'une infrastructure

*"In the Service of Industry and Development", the Industrial Research Institute offers, activities and services that cover many fields.*

*In the year 2002, new laboratories were erected, other laboratories were renovated. New sophisticated equipment were installed providing us with the ability to perform the newest and most accurate methods of analysis for various products.*

## Rehabilitation of the Electrical Laboratory

The process of rehabilitation of the electrical laboratory in the IRI took off with a new equipment that are latest in technology in their field and that will enable the laboratory to conduct major electrical analyses for all kind of electrical devices in accordance with international standards such as:

IEC, ASTM, and of course the Lebanese Standards NL. These equipment are computerized, and allow measurements to be taken with high precision and quick methodology that will enable us to save time without sacrificing accuracy.

Upon the issuance of the Ministerial Decree No 7176 whereby Lebanese standards for home appliances and electrical devices were made mandatory (specifically NL standards No 47, 95,1-96,101-2-10,101-2-12, 101-2-29,101-2-30,101-2-35,101-2-59,101-2-66), the Institute took the necessary measures on both



equipment and personnel levels to be able to effect all the measurement needed.

In addition to testing home appliances, the laboratory is able to test the industrial products such as batteries, cables, transformers, lamps, generators, circuit breakers, etc... In addition to electronic devices with a high accuracy up to 0,03%.

## Initiation of a Mobile Petroleum Laboratory and renovation of the Paint Laboratory

Further to the contract signed between CDR and Analis society, the IRI acquired vehicle and equipment for a Mobile Petroleum Laboratory and new equipment for the Paint Laboratory.

The month of February 2002 was marked by the receipt on site of the equipment of Petroleum and Paint materials.

Three engineers from Normalab Analis came to the IRI for unpacking of the equipment, starting up and staff training.

The installation of the Mobile Petroleum Laboratory is now completed, more than 15 equipment are in an operational status. Thus analyses on material like asphalt, grease, oil, fuel and different other petroleum products can be conducted as well as the Liquid Petroleum Cylinder.

20 equipment for paint analyses have been installed at the Paint Laboratory. The staff's training has also been completed enabling new analyses to be conducted: washability, hardness, gloss, color, serabability, aging by light explorer and others.



## Research projects accomplished

It is well known that the IRI is a member in a national and multinational partnership network; this network enables the IRI to assure the necessary technological tasks to develop these activities in the technical and scientific fields.

The local universities are some of IRI partners, and it is in this contest that some research and development projects have been achieved; In what follows we mention some of the achieved projects:

- Research project on a software for technical support of welding to the "arc des gougeons": "Arc Stud Welding (SW): Practical & Educational Software "; project achieved, in collaboration with the Lebanese University (Faculty of engineering).
- Research Project on the Evaluation of the Properties of Stainless Steel in the Lebanese industry; project achieved, in collaboration with the Lebanese University (Faculty of engineering).
- Research project on a measurement apparatus allowing the calibration of torquemeters. This machine has been designed by the laboratory of metrology at the IRI, the realization of the implementation plans has been entrusted to two students of the "Institut Universitaire de Technologie (IUT) Saïda, who succeeded in the finalization of this apparatus with the help of the

enterprise "Electro Mechanical Service". After a short phase of validation, the apparatus has become operational in the laboratory of metrology of the IRI.

- A student from Montpellier University did work on her research project in collaboration with the IRI. The theme of the research was implementation of a HACCP program in a mill in Lebanon.

The program set was to follow raw material through all stages of cleaning, conditioning and milling till the final product. Spot checks for microbiological examination, pesticide residue analysis and trace metals analyses were conducted as well as analysis of raw used material. Charts for physical, chemical and microbiological hazards identification have been put and physical, chemical and microbiological critical limits monitoring systems have also been set.

The department of research and development is gaining more and more important momentum in terms of new research being conducted. Some of these research projects lead to the funding of beneficial equipment that can be helpful for one of IRI's various departments on the short run and can prove to be of benefit to other Lebanese enterprises on the long run.

These research projects have been self-financed, which serves as a reminder of one of IRI's principal goals which is namely applied Industrial Research.

## Laws, Decrees and Official resolutions and IRI executory role

The work and the activities of the Institute are subject to many Laws, Decrees and ministerial decisions. For indication purpose the followings are some:

The Industrial Research Institute is by Law the sole recognized Conformity Assessment Body (CAB).

The Industrial Research Institute was mandated by the government under bilateral agreements with Syria and Morocco for product certification: Mutual Recognition Agreement (MRA).

By Law n° 475 (16/11/1964) sections 3,4,5,6,7,8 and 9 the Industrial Research Institute was given the function of design and material approval and the function of regularly testing of all steam boilers (the locally manufactured and the imported).

The Industrial Research Institute under the presidential Decree n° 3356 issued on 02/04/1993 is the party appointed by the Lebanese government to conduct testing on all new LPG cylinders and pressure gas regulators (the locally manufactured and the imported). Also the Institute is appointed to conduct regular testing of LPG cylinders at the filling stations as specified by the minister.

In accordance with the Prime Minister's decision n° 19/96 dated 15/03/1996 the Industrial Research

Institute is a member of the committee assigned to study the subject of custom's transactions.

By Decree-Law n° 1032, dated 30/07/1999, the Industrial Research Institute has the responsibility of inspecting all steel for concrete reinforcement, imported or locally manufactured to insure the conformity of the products to the conditions and requirements of the Lebanese Standards.

The Industrial Research Institute under the Decrees-Laws n° 7171, 7174, 7176, and 7177 issued on 18/01/2002 is the party appointed by Lebanese government to conduct testing on Paint, controlling the electrical safety of home appliances as testing and research concerning some food products.

According to the Decree n° 7623 issued on 14/03/2002, the administrative and public authorities must accept the national products respecting the specifications and having a certificate of conformity and quality given by the Industrial Research Institute.

By Law n° 423 dated on June 6, 2002 the Industrial Research Institute is nominated as accreditation body for welding related issues and NDT (Non Destructive Testing) as well as welder's certification.

## IRI management's commitment: policy and objectives of the quality system

The mission of the IRI is to offer Lebanese industrialists adequate service regarding scientific and technical assistance. The IRI is being increasingly solicited as the warrant of quality for various commodities used by Lebanese consumers.

The IRI is linked with prestigious establishments worldwide through international networks, which provide enriching exchanges in terms of knowledge and Know how. This coupled with the highly qualified personnel and latest technology equipment and internationally referenced methodology used enable us to fulfill our mission.

Our efforts have been confronted by an atmosphere of confidence from our partners in both public and private sectors, national and international level. This trust can be translated from the increasing amount of

work that has been conducted.

IRI is working on an accreditation program in accordance with standard ISO 17025, and all our efforts are dedicated towards the implementation of a quality system that will insure mainly:

- Customer satisfaction through accreditation by an international accreditation body
- Adequate service level oriented by continuous improvement.

In the implementation of this quality system all personnel from top Manager down to the least in raw employee are involved.

In addition a 3 years program has been worked out whereby all the documentation system will be computerized.

## Subcontracting and Partnership exchange (SPX), activities and status

In the framework of the cooperation between Lebanon and the EU, and with the assistance of UNIDO, a Subcontracting and Partnership Exchange (SPX) has been established in Beirut, at the Industrial Research Institute. The convention with the EU was signed on the 15th of December 2000 for a duration of 24 months. Another financing agreement was signed between IRI and UNIDO on the 30th of January 2001 and defines the modality of UNIDO assistance to the execution of the SPX project.

The objective of this SPX is to provide the Small and Medium Industries with advisory information and services and to promote the subcontracting and the partnership between these industries and the international SMLs.

An SPX is a center for technical information, promotion and display of capacities, processes and particularities of industrial production or services, in the shape of autonomous structure, having its main objective to create links between demand and supply of subcontracting activities.

The fundamental idea aiming at making the best use of the industrialists' production means and capacities

in a certain region came out from the fact that, in a given sector, the industrialists barely know each other and have no means to get precise information about the technical capabilities of their colleagues that could provide a part of or all their manufacture. Conversely, their own capabilities are not known by other industrialists.

Since its implementation, different missions were accomplished by SPX experts. In November 2001, a mission to France by the participation at COSTEP in Auxerre in a training on the use of OUTSOURCING software, followed by a visit to MIDEST, first industrial subcontracting fair, another participation in the SUBCON-Istanbul fair in May 2002...

During its visits the SPX-L team introduced to industrialists the subcontracting and partnership exchange of Lebanon, the concerned activities, as well as the strength of the Lebanese industry, hoping for the future collaboration between those countries and Lebanon in the fields of subcontracting and partnership.

The establishment phase of the SPX is completed and the functioning phase will be full operational by end 2003.

## Take off of the ISO certification

Auditing for ISO certification is an activity that IRI has been providing for 3 years now. The number of certified auditors at IRI has increased to 10 this year.

As the demand for this service is increasing, the IRI, in collaboration with Moody International Certification, is organizing training programs for certifying auditors.

During the last year, several companies joined the list of industries that obtained ISO certification from the IRI. These companies are:

- Château Ksara (producers of wine & arak).
- Dora Mills SARL. (producers of flour from wheat and corn).
- Harfouche for Trading & Industrising est. (paint industry).
- St George Hospital.
- Rim Co. (bottling plant - mineral water).

In addition to the above, many new request by various companies are also filing for the implementation of ISO Certification.



## International forum : "France, Africa and Middle East: a triangle for francophonie"

"Research, development and transfer of technologies: an asset for the triangle". That was the subject given by Mr. Bassam Frenn, Director General of the IRI, at the international forum titled "France, Africa and Middle East: a triangle for francophonie" that was organized by the "Association of Lebanese Graduates of French Universities" (AULUF) at the UNESCO palace between the 3rd and the 5th of October 2001, with the contribution of: Lebanese University, Sagesse University, IRI, Paris University 5, Paris University 13, Paris University 8, Rennes University 2, Nancy University 2, Reims University, Association of French Language Writers (ADELF), Center of Diplomatic and Strategic Studies (Paris), and with the support of: France Telecom Mobiles Liban (FTML), Middle East

and Africa Bank S.A.L.

"In order to reach an appreciable level of development, we should apply policies emphasizing knowledge and innovation" said Mr. Frenn. "To attain this objective, the creation of networks for circulation of scientific and technological information among researches and development center is essential.

As an example, technology transfer through development of incubators. An incubator is a place for welcoming and supporting new projects and following them through the creation of innovating enterprise by offering assistance in the form of training, counseling and financing promotion of technology and housing them until the enterprise reaches its final industrial location."

## Non-destructive Testing

Organized by the International Atomic Energy Agency (IAEA)-Vienna and hosted by the IRI, a regional training course on Non-destructive Testing of Concrete Structures was held from 15 till 25th of April 2002: The first part of this training course was held at the Industrial Research Institute Laboratories, from 15-19 April 2002, and the second part was held at Syria Atomic Energy Commission, Damascus, Syria, from 21-25 April 2002. The course objectives were: to increase the knowledge and the skills of the NDT personnel by adopting the most up-to-date techniques on control and inspection of built and under construction buildings and to check their conformity with the international standards concerning the public security.

Fifteen participants from 6 different countries attended the course in Beirut, two of them were IRI experts, and the others came from: Syria, Jordan, Saudi Arabia,



Islamic Republic of Iran and Kazakhstan. A Malaysian expert was representing the IAEA.

By the end of this training course the trainees were granted a certificate permitting them to conduct similar tests.

## Conference of the Arab Industrial Development and Mining Organization

The seventeenth conference of the ministerial committee for the "Arab Industrial Development And Mining Organization" (AIDMO) held a meeting in the conference Palace in Riyadh, Saudi Arabia Kingdom on the 14th of May 2002. This conference treated miscellaneous important subjects helping the Arab countries to strengthen their competitiveness within the international trade.

Lebanon was represented within this conference by: the Minister of Industry Mr. George Frem, Mr. Bassam Frenn Director General of the IRI, Mr. George Khoury Head of

Economical Studies at the Ministry of Industry.

The Lebanese team was accompanied by the Saudi Arabian Ambassador Mr. Bassam Al Nohmany.

The committee issued several decisions whereby they approved the reports of the executive council and the Director General and they have congratulated the organization for its earlier accomplishments.

A financial and administrative control committee appointed from six different countries and Lebanon was elected in the new executive council for the next two years.

## Workshop on Quality Label in Solar Industry

Under the patronage of his Excellency the Minister of Industry Mr. George Frenn and the President of LSES Mr. Walid al-Baba and IRI Director General Mr. Bossam Frenn, the Lebanese Solar Energy Society (LSES) in collaboration with the Industrial Research Institute organized a workshop on Quality Label in Solar Industry, at the IRI headquarters on the 30th of April 2002.

According to Mr. Frenn, The resources of Mediterranean countries can satisfy up to 40 percent of the region's energy needs through the use of renewable energy until 2020. And in addition to opportunities for solar energy, Lebanon has the "added capability of vast hydraulic energy potential". Highly industrialized nations are witnessing an increase in the number of hydraulic and solar stations, despite the fact that these countries already possess numerous nuclear plants. Economically, these techniques are cost effective both in the short and long terms, because expenses related to installation and maintenance are reduced and the raw materials are naturally available.

Mrs. Agnes Ghosn, speaking in place of the Minister of Industry commented, "Traditional energy sources, especially those that are petroleum based, have become too costly for industry. There is an urgency to find other energy sources like solar, hydraulic, and wind power. Besides being environmentally friendly, these are natural and readily available in Lebanon".

As Mr. Walid al-Baba, LSES President, mentioned that "One of our main objectives is to inform and attract public opinion regarding solar energy for the benefit of the Lebanese national economy and environment".

Participants were from both the private and the public sectors: Ministry of Industry, Ministry of Environment, Ministry of Energy, CNRS, UNDP, LSES, IRI, Elcim, Syndicate of Engineers and Architects, AUB, Spanish Embassy and others.

The workshop lasted for 4 hours, during which various talks were made, an open discussion then was held and pertinent conclusions were drawn.

## Lead Audit Course

The Industrial Research Institute in association with Moody International Certification organized a Lead Audit Course between the 3rd and the 7th of June 2002 for the purpose of certifying lead auditors by IRCA "International Register of Certificated Auditors".

The audit course was given by Mr. George Abi Rached from the Moody International Certification and Dr. Imad Hage Chehadé from the IRI.

12 candidates from various Lebanese enterprises attended this course.

The contents of this course were very practical and they included some case studies and practical exercises.

This 5-day course was intended:

- To develop ones abilities to detect, formulate and restore deviations in the quality system,
- To deepen knowledge of the ISO 9001:2000 standards
- To improve the audit methodology



- To follow a course recognized by the registration committee of IQA IRCA in order to become auditors or audit responsible.

By the end of the course, the participants were subjected to the IRCA exam. The participants that succeeded were granted a three years valid diploma.

٤- ٢٤- ٢٣ نيسان ٢٠٠٢ دورة تدريبية متعلقة بقطاع الخدمات في اطار التحضير للمفاوضات المرتقبة للانضمام الى منظمة التجارة العالمية

٣٠ نيسان ٢٠٠٢ تطوير الصناعات الشمسية في لبنان: مشاكل وحلول

٧- حزيران ٢٠٠٢ Lead Audit course - IRCA: ISO 9001:2000

٤- ١٠- ٨ تموز ٢٠٠٢ دورة تدريبية باللغة الانكليزية خاصة باتفاقيات منظمة التجارة العالمية حول الاجراءات التجارية التعويضية

والوقائية (Trade Remedies)

٤- ١٧- ٢٠ آب ٢٠٠٢ First national Workshop - Climate Change Enabling Activity Phase II Training/Awareness and Dissemination

٢٩ آب ٢٠٠٢ لقاء مع مندوبة فرنسا لدى منظمة التجارة العالمية، رئيسة فريق العمل لانضمام لبنان

٢٨- ٢٩- ٣٠ نيسان ٢٠٠٢ Ensemble Pour la Qualité - Echange Franco-Libanais

## Coordination commission of the industrial research centers in the Arab countries

Under the patronage of His Excellency, the minister of Industry Mr. George Frem, the coordination commission of the industrial research centers in the Arab countries held a meeting at the Industrial Research Institute-Beirut on the 17th to 19th of June 2002.

The personalities that attended this meeting were: the Director General of the Arab Industrial Development And Mining Organization (AIDMO), Mr. Talat Ben Zafer, the Director General of the Industrial Research Institute, Mr. Bossam Frenn, the Director General of the Industrial Analysis and Research Center, Mr. Nabil Aoun, in addition to representatives from the ministries of industry and Arab industrial research centers from: Jordan, Tunisia, Saudi Arabia, Algeria, Syria, Palestine, Kuwait, Libya, Egypt, Yemen, Morocco,... as well as representatives of Arab and international organizations working on industrial research.



During these 3 working days the participants presented case studies and project documents to improve the industry in the Arab countries. Conclusions and recommendations were drawn at the end of the meeting emphasizing on the cooperation between the Arab countries.

## The 55th Annual Assembly of the International Institute of Welding (IIW) 2002, COPENHAGEN, DENMARK

The 55th Annual Assembly of the International Institute of Welding (IIW) was organized from 23 to 28 June 2002 at the Radisson SAS Falconer Hotel and Conference Centre in Copenhagen, Denmark.

More than 570 participants representing 32 countries attended this Annual Assembly.

During the General assembly, held on Sunday 23 June, two new member countries were admitted to IIW:

- Lebanon, represented by the Industrial Research Institute

- Singapore, represented by the Singapore Welding Society

The IIW International Conference "Advanced processes and technologies in welding and allied processes" was held on 24 and 25 June 2002.

The Conference was started by the lecture on "Trends and developments within welding and allied processes" delivered by Prof. Jens Klastrup Kristensen from Denmark.

28 papers were presented during the Conference.

As usual, the Annual Assembly offered the opportunity for the Working Units including Commissions, Select Committees, Study groups and other Working Groups to meet from Wednesday to Friday.

This year, 86 resolutions were adopted by the various Working Units of IIW.

32 documents were recommended for publication in the IIW Journal "Welding in the World".

A Select Committee "Road and Automotive Transport" (SC-AUTO) was created. Mr. Johnny K. Larsson (Sweden) was elected as chairman.

The 56th IIW Annual Assembly will take place in Bucharest, Romania, under the Patronage of the President of Romania, Mr. Ion Iliescu, hosted by ISIM Timisoara, the National Research and Development Institute for Welding and Material Testing.

## مؤتمرات وندوات اقيمت في معهد البحوث الصناعية

- ٢٨ آذار ٢٠٠١ قواعد المنشأ في إطار اتفاقية الشراكة الأوروبية المتوسطية
- ١٩ حزيران ٢٠٠١ اجتماع للمفاوضات المرتبطة للانضمام الى منظمة التجارة العالمية
- ١٨ - ٢٨ أيلول ٢٠٠١ NDT - Magnetic Particle Testing - Level 2
- ٤ - ١٩٧ - ٢٣ ٢٠٠١ NDT - Radiographic Testing - Level 1
- ٤ - ٢٧ شباط ٢٠٠٢ International electrical safety meetings
- ٤ - ١٥٧ - ١٤ كانون الثاني ٢٠٠٢ دورة تدريبية متعلقة بقطاع الخدمات في إطار التحضير للمفاوضات المرتبطة للانضمام الى منظمة التجارة العالمية
- ٦ نيسان ٢٠٠٢ لقاء الكيمائيين اللبنانيين
- ١٥ - ١٩ نيسان ٢٠٠٢ Regional Training on Non Destructive Testing of Concrete Structures (IAEA - IRI)

The Industrial Research Institute has shared in different multinational activities ongoing project in various sector of interest: industry, environment, trade,... among these activities are the following:

### "Cleaner Production Center" (CPC)

The "Cleaner Production Center" (CPC) project was signed on the 2nd of July 2002 at the Ministry of Environment by H.E. Dr. Michel Moussa, Minister of Environment, Mr. Helmut Freudenschuss, Austrian ambassador in Lebanon, Mr. Giuseppe Papuli, the representative of the United Nations Industrial Development Organization (UNIDO), Mr. Jamal Itani, President of CDR.

This signature was witnessed Mr. Bassam Frenn, Director General of the IRI, Mr. Hicham Abou Jaoudeh, representative of the industrialist committee, Mr. Rafeat Saba, president of the Lebanese Union for environment protection, Dr. Berj Helegian, Director General of the Ministry of Environment and others.

The "Cleaner Production Center" is aiming to reduce the

contamination from the source by distributing instructions to the industrialists and the government responsible. These instructions give the up-to-date methods involving the environment protection and the training of the personnel in charge.

The CPC aims for training in the following activities: the correct use of energy, the correct use of water in the industry, the recycling of used products and by-products, the use of less dangerous raw materials.

This center is an example of typical coordination between the Ministry of Environment, the public sector, the private sector and international organizations in helping the Lebanese industry to environmentally rehabilitate its capacities to reach out to the environment friendly international industries.

### Integrated programme for the improvement of the competitiveness of Lebanese industry

What should be done to improve the competitiveness of the Lebanese industry and support its efforts to integrate within the global market?

It is in response to this query that UNIDO formulated in the year 2000 an Integrated Programme of technical cooperation which was then approved by the Lebanese Government.

UNIDO is a technical (specialized) agency of the United Nations system. Its strength and comparative advantage lie in the wealth of resident knowledge, expertise and experience in industrial development, especially at the level of small and medium enterprises. However, UNIDO has only modest financial resources at its disposal to carry out the programmes and projects it is requested to implement. Therefore, its ability to render assistance hinges on its success with resource mobilization.

In Lebanon, implementation of the Integrated Programme began in the year 2001 with some components for which funds were secured from various sources. Those components relate to: strengthening and restructuring of LIBNOR; establishing a subcontracting and partnership exchange system within IRI; promoting entrepreneurship in South Lebanon; reforming and improving the food safety system; establishing a National Cleaner Production Center; enhancing investment promotion in the industrial sector.

For these activities - which are still ongoing - funds were provided by Austria, Italy, the European Union and UNIDO itself. Interim results have been positive. The commitment and active participation of Lebanese institutions - public and private - in their implementation has greatly contributed to those positive results.

### "World Trade Organization" (WTO)

IRI has an important role in the Lebanese economy in the field of the balance of trade, consumer protection and other activities being the party entrusted with the activity of Conformity Assessment. As such the IRI is a member in the national committee that is working for the joining of Lebanon to the World Trade Organization (WTO) in accordance with the Decree-Law No 33/1 of the

Council of Ministers revised on the 1st of December 2000.

The IRI is playing an important and essential role in the negotiation processes through its participation in all the meetings and workshops that are organized by the follow-up unit in the Ministry of Economy as well as hosting some of these meetings.



## The Industrial Modernization Programme "IMP"

The Lebanese Industrial Modernization Programme ("IMP") is financed by the European Union. The general objective of the Programme is to enhance the capacity of Lebanese Small and Medium size Enterprises ("SMEs") to contribute to the economic recovery and growth of the country in order to facilitate the successful insertion of Lebanon into the Euro-Mediterranean Free Trade Area ("FTA").

As per the Terms of Reference ("TOR's"), the specific objectives of the Project are:

1. To improve the performance of manufacturing companies, particularly in the target sectors, through network building and access to advanced technology, through improving the quality of products and

management techniques, and through better knowledge of markets and information;

2. To open new domestic and export niches;
3. To facilitate access to long-term financing and capital investment;
4. To develop partnerships with European companies;
5. To develop the skills of specialized business support services and business support organizations, including the development of industrial zones;
6. To improve the business environment and enterprise policy

The Project which was initiated on May 2001 is expected to be achieved by end 2004.

The Industrial Research Institute is a member of the Steering Committee of the project.

## برنامج التحديث الصناعي

٢- المساعدة في فتح أسواق جديدة محلية وخارجية للإستهلاك والتصدير.

٣- تسهيل الحصول على تمويل طويل الأمد ورؤوس أموال للإستثمار.

٤- تطوير الشراكة مع المؤسسات والشركات الأوروبية.

٥- تطوير المهارات البشرية في مجال أعمال الخدمات وتطوير المناطق الصناعية.

٦- تطوير خدمات سياسة المؤسسات البيئية

بدأ العمل بهذا المشروع في أيار ٢٠٠١ ومن المتوقع أن ينجز

بنهاية سنة ٢٠٠٤ ومعهد البحوث الصناعية هو عضو في

لجنة إدارة هذا البرنامج.

يمول برنامج تحديث الصناعة اللبنانية (IMP) بواسطة الإتحاد الأوروبي ومن أهدافه الأساسية تعزيز القدرة الإنتاجية للمؤسسات الصناعية الصغيرة والمتوسطة الحجم (SMEs) والمساهمة في إستعادة عافية الإقتصاد ونموه، من أجل تسهيل دخول لبنان بنجاح وثبات في المنظمة التجارية الحرة الاورو-متوسطة (F.T.A)

ومن نطاق صلاحيات البرنامج إعداد المشاريع والمواصفات المحددة التالية:

- ١- تحسين أداء المؤسسات الإنتاجية خاصة في القطاعات المعنية من خلال بناء شبكة معلومات تقنية وإدارية تسهل الوصول إلى تطوير نوعية المنتجات ونتيجة تقنيات الإدارة ومعرفة دقيقة لمتطلبات السوق والتوزيع.

## Dioxin in various products: limitations and challenges

Since the early 1970's chlorinated compounds have been recognized as ubiquitous contaminants in the ecosystem. The dioxin-like compounds exist in three different families:

- Chlorinated dibenzodioxins (CDDs) and Polychlorinated dibenzodioxins (PCDDs)
- Chlorinated dibenzofurans (CDFs) and Polychlorinated dibenzofurans (PCDFs)
- Polychlorinated biphenyls (PCBs)

75 PCDD and 135 PCDF congeners are possible. Mainly 17 congeners are analyzed due to their higher toxicity. The most toxic is 2,3,7,8-TCDD which is classified as Class I carcinogen.

Dioxin effects on human health are many. 1 in 1000 increased chance of dioxin-related cancer risk, suppression of immune system, adverse effects upon reproduction and "chloracne".

### VARIOUS LIMITS AS SET BY DIFFERENT COUNTRIES

COUNTRY/INSTITUTE	LIMIT per kg/body wt
EPA	0.006pg
California	0.007pg
Centers for dioxin control	0.03 pg
FDA	0.06 pg
National research council of Canada	0.07 pg
Germany	1-10 pg
Netherlands	4 pg
Canada	10 pg
WHO	10 pg

Other certifying bodies insist that dioxin should simply not be there....end of the story.

### BACKGROUND AND SOURCES

PCDD and PCDF are formed occasionally in extremely low concentrations as by-products or trace impurities in different chemical processes involving chlorines and organic compounds. They can be formed by the combustion of organic compounds where chlorine is present.

Dioxins are accidental contaminants and their sources are not completely understood or known. Various accidental happenings over the years illustrate the difficulty of discovery or prevention:

- The US Food and Drug Administration (FDA) has become involved in monitoring dioxin in food mainly as a result of accidental contaminations. These events have

been uncovered periodically since 1959, when chicken were fed a fatty acid feed additive so highly contaminated (above the ultra trace level) with dioxins that many of the chicken died.

-In Netherlands, in 1963 an explosion of Philips Duphar 245-T Herbicide factory and 30-200 g of TCDD were released which caused a major eco contamination incident.

- A more recent event occurred in the summer of 1997. EPA and FDA discovered that a feed additive given to some chickens and to most catfish raised in USA was contaminated with various PCDD congeners, including the most toxic 2,3,7,8,TCDD. This discovery was the direct result of a systematic monitoring of the food supply by EPA and FDA. The source was identified and the contamination of the food supply was easily halted.

-And lately in June 1999 many contract food, environmental, and toxicological, laboratories were very busy testing food products for dioxins. This was in response to the contamination of animal feed from a Belgium supplier with transformer engine oil. The incident was followed by a worldwide panicky situation.

### HANDLING

Monitoring dioxin levels in food provides a ready basis for judging the importance of contamination events and a database useful for toxicologists and risk managers. Risk managers can use the data to assess the magnitude of current exposure through a typical diet. Monitoring data collected over lengthy periods of time can reveal trends that might indicate the impact of environmental control over sources of dioxin. For example, in Germany, dioxin levels in cow's milk have declined over 30% in the past 10 years. The success was due mainly to the efforts that were taken in the extensive monitoring of dioxin levels.

As mentioned earlier dioxins are ubiquitous and they can be present in various matrices such as water, soil, fly ash and biological tissues. Analysis of dioxin involves exhaustive sample preparation and the need for very sensitive methodology because the ultra trace level of expectancy (1ng/g is very high). This makes

testing rather costly, the thing that might play against the general screening analytical which was earlier highlighted in importance.

## METHODS OF ANALYSIS

Dioxin analysis may be performed on a wide range of samples from biological tissues to drinking water to waste samples. Examples of brown trout, pulp and paper, effluents and atmospheric emissions from a municipal solid waste incinerator etc...

Thus the cleanliness of the samples are variable and while the fish tissue, pulp and paper are relatively clean the MSW incinerator liberates a highly contaminated matrix.

Dioxin analysis through either conventional or modern analytical techniques involves exhaustive sample preparation followed by high-resolution mass spectrometry (HRMS) for detection and quantitation. This process is quite costly and time consuming when compared with other analyses. MS/MS has been tried with dioxin analysis from early 1980's to the early 1990's, but the procedure required either a hybrid high-resolution mass spectrometer (HRMS) or a triple quadrupole mass spectrometer. The limits of detection (LODs) achieved were usually 5-10 folds lower than with HRMS, so MS/MS was not suitable to use for food analysis. A conventional sample preparation procedure was usually required, so there was little advantage to using MS/MS until recently.

The development of relatively inexpensive quadrupole ion traps has made MS/MS possible in bench top instruments, costing 20 %-25% of the cost of the older instruments.

In 1995, the first commercial ion-trap MS/MS instrument was manufactured and it was used for detecting 17 of the most toxic dioxins and furans in foods. Comparison of results with those obtained using HRMS on split samples agree quite well, although ion-trap MS/MS is still not as sensitive as HRMS. (0.15 pg /injection only can be detected with ion-trap MS/MS).

The ion-trap is simpler to operate, with shorter and less frequent down times it's cost and it's operating and repairing cost is much lower than that of the HRMS.

On the other hand, the HRMS results are more sensitive for regulatory purposes the high-resolution instrument remains to be required one especially for food analysis and that is one the account of better sensitivity and selectivity.

For example MS/MS is necessary to reduce interferences by compounds similar to dioxins and furans, including Polychloronaphthalenes (PCNS), Polychlorothiophenes (PCTS) and Polychlorodiphenylethers (PCDFE'S) so in order to separate such components as well as the other approximately 200 congeners a long 60 meter j&w DB5-dioxin column would be used. However the bleed on such a column is so high that it sacrifices on the sensitivity.

Cost per test using HRMS is rather expensive E.G.5200ff per sample is charged in France 500 sterling pounds in UK coupled with other expenses required for transport it will add up also the duration for the completion of results will require between 3 and 4 weeks.

In short ion-trap analysis for some congeners may fail making HRMS necessary. Conversely HRMS is subject to noise interference.

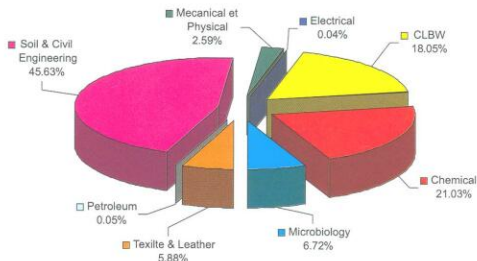
Sample preparations depend on the complexity of samples but it might need a combination of solid-phase extraction followed by a sequence of pre-packed clean-up columns. The use of immunoaffinity columns is one approach that could simplify sample preparation, but this has not been extensively tested.

Immunoassay methods have been developed but for them to be effective for dioxins in food that would require that the limits of detection per should at least 1pg, and probably less in order to compete with HRMS sensitivity. The best LOD developed was 25pg/well, but the real problem was how to prepare, concentrate, in a good and efficient manner. Dioxin analysis requires 1000-10000 fold concentrations which actually necessitates removing almost the entire matrix.

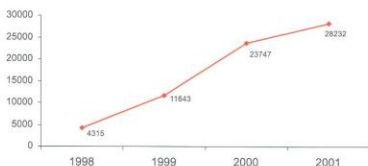
Dioxins will continue to be monitored in foods and environmental samples into the foreseeable future. Their unique mechanism of action and ultra trace concentrations will continually present challenges to the development of efficient analytical methodologies.

## Testing and analysis

### \* Percentage of tests and analyses in 2001



### \* Tests and analyses in 1998 / 1999 / 2000 / 2001



## Product Certification: the battle for quality and consumer protection

The Lebanese industry is growing more and more aware of product certification, which is beginning to gain ground among industries. To be able to face domestic and foreign competition, and ensure that the Lebanese consumer is getting the quality product that he deserves, the IRI has established a system to issue product certification through its own mark (IRI), in addition to the NL certification of LIBNOR or other European marks (CE and NF for example) for some specific products.

During the last few years, the Lebanese industrial community has become more and more aware and interested in conforming the quality of their products through this certification process or activity. Nine industrial products have already obtained the IRI and/or NL marks:

- Ciment Portland P 42.5 (Cimenterie Nationale).
- Ciment Portland P 52.5 BTNa RMS (Cimenterie Nationale).
- Ciment Portland PA-L 42.5 Montagne (Holcim Liban s.a.l.).
- Ciment Portland PA-L 42.5 Mer (Holcim Liban s.a.l.).
- Ciment Portland P 42.5 (Ciment de Sibline).
- Lebanese Electrical Industries (LEI) (enamelled copper wires)
- Aluminum Profiles (Alutex 2000 s.a.l.)
- Aluminum Profiles (Aluxal s.a.l.)
- Refrigerators & Freezers (Lematic Ltd.)

More details on product certification will be published in the next issue.

