From the Director General:

2000 IN RETROSPECT

Environmental Policy

Wastewater Treatment and Reuse

Reduction of Salinity in Municipal Sewage

Air Quality
Dear Reader,

The Autumn 2000 issue of Israel Environment Bulletin focuses on wastewater treatment and recovery. Reuse of effluents for agricultural purposes is not new in Israel. It has been practiced for more than 30 years. In fact, Israel has emerged as a world leader in the utilization of effluents for irrigation - reaching a 76% rate. Today, the goal is to reach a 100% rate in order to reduce the growing gap between water supply and demand.

Wastewater reclamation for agricultural and industrial purposes is imperative in Israel. However, it is not without risk. To reduce risks to human health, agricultural crops and groundwater, major reforms are necessary - most importantly, upgrading of effluent standards. The process has already begun with the establishment of sophisticated new treatment plants throughout the country. It is also being advanced with the drafting of new legislation setting stringent standards for wastewater designated for different purposes. High on the priority list is reduction of salinity in municipal and industrial waste, a major impediment in agricultural utilization of effluents.

The Bulletin is proud to present a review of recent achievements in this area, some of which are unique to Israel.

The Environment Ministry's work plans in every area - whether air quality, wastewater treatment, or waste management - are now based on a clear environmental policy. It is the ministry's conviction that implementation of these principles in years to come will bring about sustainable growth, conservation of precious resources, and protection of the quality of the environment for the benefit of the population as a whole.

The fruits of this new policy are already beginning to bud with new initiatives in such areas as air pollution abatement, recycling, and river reclamation, to name but a few. These will be described in further detail in future issues of the Bulletin.

Meanwhile, may the new year advance us all further on the path toward sustainability.

Shoshana Gabbay
Editor
As the year 2000 drew to a close, Director-General Yitzhak Goren provided Israel Environment Bulletin with a brief review of achievements and challenges during the past year. The highlights of his review are presented on the following pages.

Environmental Policy

This year was pivotal in the development of the Ministry of the Environment. I am convinced that even some of our less "visible" achievements - especially the formulation of an environmental policy - will serve as the foundation of our work for years to come.

Our policy is based on such principles as integrated management of the environment and wise use of environmental resources, prevention at source, the "polluter pays" and the "precautionary" principles, community involvement, social justice, and regional and environmental cooperation. These principles are already serving as the basis for multi-annual and integrated work plans in all areas. They have helped us to define major environmental problems, to decide on priorities for treatment and to set quantifiable targets for achievement in every area, from recycling to air pollution abatement.

We are already implementing the principles of our environmental policy in all areas. For example, our campaign to reduce radiation levels from the Hillel transmission station, along with the residents of the nearby town of Zoran, was based on the "precautionary principle." In this case, not only did we succeed in limiting radiation levels, but we also encouraged community participation and activism - with very positive results.

We recently set up a new section on policy and environmental planning. Its main functions will be to advance such critical subjects as protection of open spaces, promotion and assimilation of sustainable development at all levels, intensification of links with the community and with green bodies, and preparations for Rio + 10. Special emphasis will be placed on Israel's relations with the international community and on its global environmental commitments.

Environmental Law Enforcement

Environmental law enforcement is of the highest priority. I am convinced that our efforts today will impact on the quality of our life and our environment for years to come. During the past year, we instituted a finable offense system in the areas of cleanliness and noise, with plans to expand the system to roadside inspections of vehicular pollution and inspections of gasoline stations. The system provides for the imposition of both higher fines and immediate fines on violators of environmental laws, in accordance with the "polluter pays" principle.

The unique combination of finable offense procedures along with a dedicated Green Police unit and seven Civil Guard Units for the Environment will increase deterrence and strengthen enforcement, both within and outside of major cities. The results are already evident. For example, the Netanya Civil Guard Environmental Unit has succeeded in stopping nearly all sand theft from its adjacent Mediterranean coastline. The Yahalom unit in Tel Aviv, a police unit set up in June to deal specifically with quality of life problems in the Tel Aviv-Jaffa area, issued 2400 reports on environmental offenses over the past six months and will expand its operations to roadside inspections of vehicular air pollution with the aid of a new mobile monitoring unit. This year, our enforcement system reported over 12,000 cleanliness offenses and instigated 250 investigations. Enforcement will continue to be high on our priority list in order to impress on both industrial plants and the general public that "polluters will pay."
Environmental Awareness & Environmental Justice

Over the past year, special emphasis was placed on promoting environmental awareness and justice among all segments of society. We allocated special resources to improving cleanliness and environmental quality in disadvantaged areas, we financed "green" camps in development towns and in the Arab sector with the participation of thousands of children, we sponsored a "Love Day to the Environment" with free transportation and free entrance to all of the country's national parks and nature reserves and with the participation of 68,000 people. We hope to strengthen and expand these activities in the future.

Solid Waste

One of the most exciting developments of recent weeks heralds the beginning of a new era in our treatment of municipal waste. We have stopped speaking to local authorities in the language of financial aid for environment-friendly landfilling. Our terminology has changed so that now we are speaking the language of economic incentives and financial aid to municipalities to promote recycling and to establish recycling infrastructures.

We have already allocated NIS 12 million (nearly $3 million) out of NIS 34 million for the establishment of three infrastructure facilities for waste recycling: in Hadera, in Kfar Saba and in the Drom Yehuda Town Association. This should bring about the recycling and recovery of 1.1 million tons of municipal solid waste over the next five years. Two of the facilities, in Hadera and Kfar Saba, will use an innovative technology developed in Israel by Arrow Ecology Ltd. The technology does not require presorting, recovers recyclable materials such as metals, plastics and glass, and biologically transforms the organic fraction of the waste into biogas and stabilized compost. Financial support of recycling projects and infrastructures should raise recycling levels from the current rate of 15% to 20% by the end of 2001 and 25% by 2003. I am certain that these developments will open the way to new initiatives for alternative solid waste treatment, whether recycling or incineration, in other cities throughout the country.

Water Management

In yet another crucial area, water management, this year has seen a major breakthrough. We succeeded in mobilizing the entire government to address the grave problem of the collapse of our water system. As a result of the activities of the Environment Ministry, and especially of Minister Dalia Itzik at its helm, a comprehensive action plan was drawn and approved, and most importantly, substantial budgets were allocated for such projects as seawater and brackish water desalination, effluent recovery and reuse, reclamation of contaminated wells, and water conservation.

River Reclamation

A sizable portion of the ministry's total budget - NIS 13 million - is allocated to river reclamation in addition to the very significant funds provided by the Jewish National Fund. This will ensure that long-term reclamation plans are accompanied by the allocation of multi-annual budgets. Progress is already evident in several rivers where pollution sources have been eliminated and parks established. In the Alexander River, a "model" stretch of 700 meters was rehabilitated, in the Harod River several parks are being developed along a 5-kilometer section, and along some sections of the Yarkon River, plans will see the creation of bicycle paths, a park at the confluence of the Ayalon and Yarkon Rivers and conservation and rehabilitation of flour mills. Major efforts are currently centering on restoring the Kishon River, with first priority given to stopping the discharge of industrial effluents from major industrial plants by the end of 2001.
Air Pollution

Air pollution, especially vehicular pollution in our major cities, is a very grave problem. Our goal is to reduce air pollution from transportation sources through a systems approach that includes upgrading of fuel quality to European standards by 2001, switch to low-sulfur diesel fuel by the bus cooperatives, introduction of 20 buses into the fleet which will be powered by liquefied petroleum gas (LPG), and development of economic tools and incentives for reducing air pollution. Our nearly completed national air quality monitoring network is already providing updated information on air quality levels throughout the country. We will publish and publicize these results for the benefit of the general public in the coming year.

Hazardous Wastes

Initial remediation activities in evaporation pools at the national site for the treatment of hazardous waste at Ramat Hovav have begun with the infusion of NIS 26 million this year and a similar sum next year. At the same time, the ministry has granted financial aid to industries which develop and/or use technologies targeted at reducing hazardous waste at the plant level.

Future Goals

Although these and other achievements of the past year are gratifying, much remains to be done and more struggles must be undertaken to upgrade the subject on the national and public agenda and to internalize environmental considerations in decision-making.

Our objectives for the coming year include the following: to strengthen and expand recycling by advancing recycling infrastructures in more and more local authorities, to advance river rehabilitation by combining multi-annual planning with multi-annual budgetary allocations, and to develop and implement economic, statutory and technological tools to improve air quality. At the same time we will focus on strengthening our links with the international environmental community in order to increase our own environmental capabilities and to promote Israeli environmental technologies and know-how in the world at large, we will promote public awareness and involvement in environmental issues and deepen community activity, we will continue to develop and to implement work plans accompanied by quantifiable targets, and we will define the state of the environment in quantitative and qualitative terms so that, based on these indicators, we will be able to set professional targets for improvement in all areas over the next five years.

What can each individual do?

Everyone can contribute to a better environment. Take your plastic bottles to a recycling bin, save water, maintain your car properly, don't litter, save on plastic bags at the grocery, save packaging material, save electricity, install energy-conserving lighting fixtures, complain to your local authority concerning environmental problems, join environmental forums.

Our message is simple and clear: View the external environment as an extension of your home; take care to preserve and nurture it.
PRINCIPLES OF ENVIRONMENTAL POLICY

The Ministry of the Environment lays the foundations of its environmental policy

In order to facilitate the formulation of multi-annual action plans, to define central environmental problems and to set priorities for treatment, a clear statement of environmental policy is necessary. In the year 2000, the Ministry of the Environment set out to do just that. A survey of environmental guidelines and targets in countries worldwide, a preliminary policy document adapted to environmental conditions in Israel, and a comprehensive review by all units of the Ministry of the Environment led to the formulation of a policy document which will guide the ministry’s activities for years to come. Its principles have already been integrated into work plans and programs for both the years 2000 and 2001.

In general, special attention is focused on the following five issues:

- **Water and water sources:** river reclamation, prevention of water pollution in general, and groundwater in particular.
- **Air:** protection of air quality in general and urban air quality, in particular.
- **Land:** protection of open spaces, prevention of soil pollution and integrated treatment of solid waste.
- **Seas and coasts:** sustainable development of coasts and prevention of marine pollution.
- **Biological diversity:** protection of habitats and prevention of loss of species, which are important to the development of science and of humankind.

THIRTEEN PRINCIPLES OF ENVIRONMENTAL POLICY

1. Government Guidelines
The Ministry of the Environment will act according to the guidelines set by the government which establish the following: "The government will protect the quality of the environment, take action to prevent water and air pollution and take steps to eliminate or reduce ecological nuisances..." This will be undertaken in a manner that will assure the protection of the environment based on sustainable development principles, while providing for economic and social development and for a better quality of life for the individual.

2. Environmental Quality and National Priorities
The Ministry of the Environment will strive to upgrade the environment on the national scale of priorities and to assimilate it in the decision-making processes of central and local government.

3. Wise Use of Environmental Resources
The Ministry of the Environment will encourage diminished use of environmental resources, while encouraging conservation and preventing irreversible damage to resources through planning, technological and economic measures. The ministry will give priority to the prevention of processes and plans which threaten irreversible and irreparable damage to the environment.

4. Integrated Environmental Management - Integrated Activity
Environmental management will be based on a comprehensive systems approach which takes account of impacts on the totality of environmental resources. The Ministry of the Environment will strive to incorporate environmental considerations, at the
outset, in planning and implementation systems. The ministry will avoid solutions which merely displace nuisances from one locality to another, as a substitute for treatment. All polluters will be obligated to treat pollution on the basis of best available know-how and technology, while minimizing damage and risk to the environment. The ministry will guide the authorities responsible for establishing environmental infrastructures for pollution products on siting, standards and outputs.

5. Assimilation of the "Polluter Pays" Principle
Both polluter and the user are responsible for the pollution and damage they cause to environmental resources. Therefore, they are responsible for repairing or compensating both the environment and society for the loss or damage to resources.

6. Treatment at Source
The Ministry of the Environment will promote solutions to environmental problems based on prevention at source, elimination, or reduction of nuisances at source.

7. Precautionary Principle
The Ministry of the Environment will solve environmental problems, especially those for which only partial information is available, on the basis of the "precautionary principle."

8. Public Participation and Recruitment on Behalf of the Environment
The Ministry of the Environment views the public as a full partner in environmental activities and will take steps to deepen this participation through integrated activity in three spheres:
- Cultivating environmental values and behavioral norms based on protecting the environment and working on its behalf;
- Recruiting corporations and organizations as active partners in environmental issues;
- Harnessing local authorities to cultivate environmental quality for the benefit of their residents.

9. Impacting Public Behavior
Alongside the creation of partnerships with the public on behalf of the environment, the Ministry of the Environment will reduce environmental deterioration by:
- Utilizing enforcement measures to remove nuisances and promote deterrence.
- Resolving environmental conflicts through mediation mechanisms.

10. Environmental Justice
The Ministry of the Environment will act according to equitable standards and criteria in protecting environmental resources and will assure the just distribution of environmental rights among geographical areas and population groups.

11. Regional Cooperation
The Ministry of the Environment will strive for regional environmental cooperation since environmental resources in Israel impact on and are impacted by neighboring states.

12. International Cooperation
The Ministry of the Environment will strive to include Israel as a full partner among developed states and to integrate it in international activity on behalf of environmental improvement and in the formulation of suitable conventions, their ratification and their implementation.

13. State of the Environment
The Ministry of the Environment will develop a system for integrating all databases for the purpose of creating an updated picture of environmental quality and environmental risks in Israel, future trends, and processes underlying environmental changes. This will serve as a basis for decision and policy making, will provide feedback on ministerial activities, and will serve as a tool for assessing achievements.
WASTEWATER TREATMENT AND REUSE

The sustainable utilization of effluents will be a major component in Israel’s future water policy.

The combination of severe water shortage, contamination of water resources, densely populated urban areas and highly intensive irrigated agriculture, makes it essential that Israel put wastewater treatment and reuse high on its list of national priorities. Effluents are the most readily available and cheapest source of additional water and provide a partial solution to the water scarcity problem.

National policy calls for the gradual replacement of freshwater allocations to agriculture by reclaimed effluents. In 1999, treated wastewater constituted about 22% of consumption by the agricultural sector. It is estimated that effluents will constitute 40% of the water supplied to agriculture in 2005, 45% in 2010 and 50% in 2020.

Rules governing the treatment of wastewater designated for irrigation of different crops were established by the Ministry of Health in 1981 under the Public Health Ordinance and are currently being revised. Regulations setting standards for wastewater treatment were promulgated by the Ministry of Health in 1992. They require municipalities or industries whose sewage exceeds an amount equivalent to 10,000 residents to treat sewage to a minimum baseline level of 20 mg/liter BOD and 30 mg/liter suspended solids. Efforts today are focusing on establishing higher levels of treatment for discharge of effluents to rivers and for effluents designated for irrigation above phreatic aquifers.

Treatment Plants: Facts and Figures

Data reveal that of a total of 440 Million Cubic Meters (MCM) of wastewater produced in Israel in the beginning of the year 2000, about 61% were reclaimed for agricultural purposes (76% of the effluents) and the remainder was released to the environment (rivers or sea). Treatment levels are frequently inadequate and about half of the effluents produced in wastewater treatment facilities throughout the country do not meet criteria established in the regulations. In a few localities, namely in Acre, Nahariya and Beit She’an, wastewater treatment plants have not yet been constructed. The result: discharge of some 15 MCM of sewage to the environment. A similar quantity of sewage, 15.7 MCM, is discharged to cesspools in rural areas. In several other areas, stabilization ponds, many designed long ago, generate medium or low quality effluents.

About a quarter of Israel’s total wastewater (nearly 120 MCM) undergoes treatment in the Dan Region Wastewater Treatment Plant which produces high-quality effluents. The system consists of facilities for collection, treatment, groundwater
recharge and reuse of municipal wastewater from the Dan metropolitan area which comprises the city of Tel Aviv and several neighboring municipalities (e.g., Rishon-Le-Zion, Holon, Bat Yam, Jaffa, Petah Tikva, Ramat Gan, Givatayim, Bene Brak, etc.). It is based on a modern biological-mechanical activated sludge plant with nitrogen removal. Following treatment, the effluents are recharged into the regional aquifer by means of spreading basins. A separate zone is created within the regional aquifer which is centered beneath the recharge basins and is dedicated to treatment and seasonal storage of the effluents (SAT - Soil Aquifer Treatment). After recharge, the reclaimed water is supplied for agricultural irrigation to the arid southern part of the country, through the so-called Third Line to the Negev.

In the Haifa region, the treatment plant of the Greater Haifa region (Kishon Reclamation Plant), which was recently upgraded and expanded, treats about 37 MCM of wastewater annually, of which 25 MCM are reused for agricultural irrigation in the Jezreel Valley.

Recent years have seen the establishment of new or upgraded intensive treatment plants, producing high quality effluents, in such municipalities as Haifa, Netanya, Hadera, Kfar Saba, Herzliya, Ramat Hasharon, Ra'anana, Jerusalem, Karmiel, Afula, and most recently, in Ashkelon and Eilat. Other treatment plants, such as the ones in Beit Shemesh and the Tel Mond region, are already in their run-in stage. Still others, such as Ashdod, are in planning stages and are slated for operation in the next few years. In a few localities, such as a Jerusalem neighborhood, microfiltration will become the treatment method of choice.

Toward Higher Effluent Standards

Today, standards for effluent quality from the health perspective are incorporated in the Public Health Ordinance. However, based on the assumption that in the medium to long range, most of the effluents will serve both for irrigation and for discharge into rivers, standards must be updated to comply with more stringent requirements.

Experts warn that increased irrigation by effluents carries significant risks to groundwater, to soil and to agricultural crops due to the high content of salt and boron and, in some instances, heavy metals. While wastewater treatment plants reduce organic load and remove pathogens, they do not reduce concentrations of brines and boron and do not fully treat heavy metals. Moreover, while crop damage may be detected within a few years of effluent irrigation, damage to soil and water sources may only be discovered many years later.

The coastal aquifer is a case in point. The area overlying this aquifer is irrigated by nearly 50 MCM of effluent each year. Based on an average chloride concentration of 350 ml/liter, this adds some 17,500 tons of chlorides to the groundwater in addition to undesirable concentrations of organic compounds, nitrates and heavy metals. Continuation of the present effluent and management regime in the coastal aquifer will not only accelerate the rise in salt concentrations but will lead to an increase in other pollutants as well. It is widely agreed that existing practices and policies on wastewater treatment and effluent irrigation above areas sensitive to contamination in the coastal aquifer must be revised.
Effluent irrigation in these areas may only be feasible following desalination or further upgrading of existing wastewater treatment facilities.

River reclamation presents yet another challenge. On the one hand, successive years of drought have shown that the reality of water scarcity in Israel threatens to leave the country’s rivers dry if other means are not taken to replace or supplement fresh water supply. On the other hand, discharge of medium quality effluents will threaten ecosystems and the development of recreation and leisure activities. Therefore, ministerial policy calls for strict control measures for the discharge of effluents to rivers. With river reclamation high on the priority list of the Ministry of the Environment, draft regulations on effluent quality discharged to rivers have been prepared which relate to the quality of effluents (standards covering physical, chemical and microbial parameters), to additional storage of the effluents for a ten-day period after treatment, and to smell indicators.

In addition, the Ministry of the Environment in cooperation with the Ministries of Health and Agriculture, has formulated guidelines and draft regulations which require wastewater treatment plants to stabilize and treat the sludge they generate as a condition for agricultural use or soil improvement. The draft regulation establishes maximum permitted levels for heavy metal and pathogen concentrations in sludge designated for agricultural use, defines specific uses for different types of sludge (A and B), sets limitations on areas of sludge use, and prescribes requirements for warning signs, transport and storage. All new plants will be required to incorporate technologies for the production of type A sludge from the outset while existing plants will be required to phase out type B sludge and to reach type A levels by the year 2004. The aim: to prevent damage to agricultural crops, public health, soil and groundwater.

**Sludge Disposal and Treatment**

The trend in Israel is to gradually convert many of the outdated extensive wastewater treatment systems to intensive plants. However, wastewater treatment plants which use the activated sludge method generate large quantities of sludge, at a scope of hundreds of tons of dry matter per day. Sludge quantities already exceed 100,000 tons per year (dry weight) of which nearly half is produced by the Dan Region Wastewater Treatment Plant. It is anticipated that by 2020, when many more intensive treatment plants will be in operation, sludge quantities will double and the fraction produced by the Dan Region Treatment Plant will drop to about a quarter of the total.

The Ministry of the Environment regards sludge as a valuable resource for fertilization and soil improvement, but only following appropriate treatment to reduce pathogens and vectors and to control and reduce heavy metal concentrations. Surveys of sludge composition in several cities have revealed high concentrations of certain heavy metals in the sludge of the Dan metropolitan area and Haifa. Since these concentrations have largely been traced to the surface treatment of metals, strict supervision and inspection of electroplating and metal finishing plants were initiated in recent years to ensure that plants carry out the requisite pretreatment procedures before discharging their waste. Regulations on the prevention of water pollution from the discharge of metals and other pollutants into the sewage system set conditions for reduction of pollution at source through changes in production processes themselves (see Environmental Legislation).

**Toward the Future**

The Ministry of the Environment has set the following target: treatment of 100% of the country’s wastewater to a level enabling unrestricted irrigation in accordance with soil sensitivity and without risk to soil and water sources. To achieve its target, the ministry has already drafted recommendations for effluent quality standards for different purposes. The recommended values, designed to minimize potential damage to water sources, flora and soil, call for much higher treatment levels in existing and future wastewater treatment plants. By the year 2005, most of the country’s sewage should comply with standard levels stipulated by law. Improvement is definitely in sight.

Special thanks to Dr. Yeshayahu Bar-Or and to Dr. David Rubin of the Water and Rivers Division for their contribution to this article.
REDUCTION OF SALINITY IN MUNICIPAL SEWAGE

Major efforts are focusing on reducing the salinity level of municipal sewage in order to assure effluent recovery for irrigation purposes.

Israel's Water Law of 1959 defines the term "water source" broadly to include sewage water. In a country plagued by water scarcity this is not surprising. Since surface and groundwater sources cannot meet the demands of a rapidly growing population and economy, Israel has accorded high priority to the development and use of treated wastewater. Today, Israel is one of the world leaders in recycling wastewater - recycling more than 75% of its effluents for agricultural purposes. As effluent quality improves, more reclaimed water will be diverted to agricultural use while fresh water will be directed toward urban and industrial use.

Rules and Regulations

By law, adequate pretreatment of industrial sewage prior to discharge into the municipal sewage system is required of industrial plants. However, the Model Local Authorities Bylaw (Discharge of Industrial Wastes into the Sewage System), 1981, which sets requirements on the discharge of industrial wastes into the sewage system, is outdated and does not adequately address important environmental issues. Therefore, recent years have seen a flurry of new and draft regulations designed to improve industrial wastewater treatment. In some instances, regulations are based on European standards (e.g., regulations limiting the discharge of heavy metals during industrial processes); in others, they are specifically targeted to conditions which are unique to Israel (e.g., prohibitions on the discharge of brines to municipal sewage systems and limitations on concentrations of chlorides, boron and sodium in detergents).

Special attention is currently focused on addressing environmental problems which have not yet been fully confronted elsewhere in the world: problems relating to salination of municipal sewage in a country in which wastewater recovery for agricultural purposes is imperative.

Reduction of Salinity

Industrial plants emit effluents containing tens of thousands of tons of salt each year. It is estimated that industry contributes some 50% of the total chloride addition to municipal sewage, of which some 30% is derived from industrial water softening processes. The subsequent salt enrichment of municipal sewage is a major impediment to effluent irrigation. High salinity levels reduce crop yields, damage agricultural soils and contaminate groundwater. The concentrations of total dissolved salts in Israel's sewage in general, and the levels of chloride, sodium and boron in particular, are limiting factors in the reuse of effluents in agriculture.

To reduce the quantity of salt used in the water softening process and the consequent emission of brines into the municipal water system, the Ministry of the Environment promulgated regulations in 1994 on the reduction of salt use in the regeneration of ion exchange. This was followed by regulations, promulgated in 1998, that prohibit the discharge of brines (exceeding 10 tons of salt per year) from ion-exchange renewal, from food, tanning and textile industries, and from hospitals to water sources and to municipal sewerage systems. To further increase efficiency and enforcement, special conditions have been added to the licensing requirements of plants using ion exchange. These conditions are continuously being refined and upgraded to increase compliance with the regulations. Today, new regulations are being drafted which will totally...
Discharge of Brines to Sea

Discharge of brines to sea is the most readily available means of preventing salinization of the environment. It requires a permit from the interministerial permits committee on discharge of wastes to sea according to the Prevention of Sea Pollution by Land Based Sources Law and its accompanying regulations (which comply with the Land-Based Protocol of the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution). Sea discharge of brines is only permitted if it established that a land alternative for disposal does not exist and that marine pollution will not be caused. Discharge may either be direct from each factory to the sea through a dedicated pipeline (in practice, very few plants have opted for this method) or by transport of brines by tankers to regulated discharge points on the coast. Since 1995, when the first sea terminal for the discharge of brines to the sea was commissioned (today there are ten discharge sites along the Mediterranean coast, Dead Sea and Eilat), the volume of brines discharged to the sea under controlled conditions has increased significantly. In 1996, 21 plants discharged their brines to sea. This number increased to 36 plants in 1997 and 79 plants in 1998. By 1999, 103 plants were granted discharge permits or permits for discharge to sea. In all, more than 555,000 cubic meters of brines containing over 17,600 tons of salt were discharged to sea last year, 55% of which originated in the textile industry and 15% each in ion exchange and slaughterhouses (which use significant quantities of salt in the meat koshering process).

Data for the first half of 2000 reveal a further increase in quantities. In the first six months of the year, 107 industrial plants were granted permits to discharge their brines at one of the ten approved sites, and 321,000 cubic meters of brines were discharged to sea containing some 11,000 tons of salt (dry weight). This is a 15% increase in comparison to the equivalent six-month period in 1999. If textile brines are excluded, the increase is even more significant: a 50% increase in brine quantities and a 29% increase in the salt content of the brines. Seven large industrial plants (disposing over 10,000 cubic meters each) contributed 75% to the total quantity of brines while the remaining 25% was contributed by 100 plants. These data do not include numerous plants which are situated adjacent to the coastline and discharge their brines directly to sea (such as industrial plants in the vicinity of the Kishon River in Haifa which discharge some 800 tons of salts to the sea each day) nor plants which discharge directly to evaporation ponds. At present, it appears that there is no viable land-based solution to the brines discharged by the Kishon plants.

The Results

The results of the ongoing effort to reduce brine discharge into the environment are clearly visible. Surveys conducted in two of Israel’s largest sewage treatment plants – in the Greater Tel Aviv and Haifa areas - which together contribute about 40% of the effluents generated in Israel - have shown steady reductions in both chloride and sodium concentrations since regulatory and enforcement activities began in 1993. As seen in the following graph, chloride concentrations in the sewage of the Dan metropolitan area have dropped from 340 mg/liters in 1993 to 260 mg/liters in 1999. Since the total quantity of wastewater discharged to the Dan Region Wastewater Treatment Plant is about 120 million m^3/year, this translates to a decrease of 9,600 tons in chlorides or 16,000 tons of salt. Similarly, sodium concentrations have decreased from 249 mg/liter to 194 mg/liter. The decrease is attributed to the closure of some large textile factories, to discharge of brines to sea and to adoption of reverse osmosis technologies by a large number of industrial plants in the Greater Tel Aviv area.
Encouraging results are also evident in the Haifa region as seen in the following graph. This is attributed both to the closure of two major plants which contributed hundreds of tons of salt to the wastewater and to the significant rise in discharge of brines to sea.

**Ion Exchange**

Water softening processes have been identified as major contributors to the high chloride concentration of Israel's wastewater. It is estimated that the quantity of sodium chloride consumed for ion exchange is about 20,000 tons per year. In 1999, some 1700 tons of salt were disposed to sea while in the first six months of the year 2000, 963 tons of salt were disposed to sea (more than twice the quantity removed in the equivalent period of 1999).

The difference between the quantity consumed for ion exchange and the quantity removed for discharge to sea is attributed to several factors:

- A significant number of plants have switched to alternative technologies, especially reverse osmosis and use of "hard" water in cooling towers. It is estimated that over 400 reverse osmosis systems were sold to industrial plants over the past two years.
- A significant part of brines from ion exchange are consumed by industries which are not subject to present requirements which only apply to plants that consume more than 10 tons of salt per year.
- Numerous plants and businesses do not comply with the regulations and continue to discharge brines to the sewage system. Intensified enforcement measures will be initiated to increase implementation by such groups as hospitals, malls and industries.
- Some industrial plants do not remove the entire quantity of brine required under the regulations. Random samples have shown that in some instances, salt concentrations exceed 7%, well above the 2.5% figure stipulated in the regulations. To address the problem, the Ministry of the Environment is preparing additional conditions which will be incorporated into the business licenses of relevant plants. These will require more stringent reporting procedures as well as adherence to specific parameters which will apply to brine quantities and salt concentrations in the brines.

**Detergents and Washing Powders**

In a significant development, a new Israeli standard (IS 438) on environmental and labelling requirements for washing powders was published in 1999, which replaces a standard first published in 1982. The new standard adopts European Union standards on biodegradability, but goes much farther in relation to Israel's unique conditions: it establishes new standards...
relating to the prevention of water source salination. Accordingly, industry will be required to reduce boron concentrations by 60% in four years and 94% in up to eight years. This should significantly enhance the possibility for wastewater reuse under conditions of water scarcity. (See article on p.15).

Swimming Pools and Cooling Towers

The annex to the Model Bylaw for Local Authorities Law (Discharge of Industrial Wastes to the Sewage System), 1981, prohibits, inter alia, the discharge of industrial waste which includes recycled cooling water or brine. Thus far, the Ministry of the Environment has invested major efforts in preventing the discharge of industrial brines to the municipal sewage system, without specifically relating to drainage from cooling towers. In recent years, new directions have been pursued in the struggle to reduce the salinity of Israel's wastewater. One initiative focuses on the contribution of air conditioning systems using water-cooled condensers to both water consumption and salinity. A recent survey of large and medium size plants using water-cooled condensers estimated that this sector alone consumes some 18 MCM of water and discharges 4.8 MCM of brines each year, containing 27,000 tons of chlorides and 12,000 tons of sodium (other estimates note even higher numbers). Since water-cooled condensers are also widely used in large public institutions throughout the country (e.g., Israel Parliament, museums, hospitals, universities, office buildings, cultural halls), it is estimated that about 50 MCM of water are consumed each year for such water-cooled condensers alone. A more recent assessment suggests that the quantity of water used for air conditioning and industrial cooling is much higher - 130 MCM per year. It is estimated that the quantity of water which will be required for cooling the expanded facilities of Ben-Gurion International Airport alone will reach 600-700 thousand cubic meters per year!

Preliminary findings show that a switch to air-cooled condensers would save large quantities of water for urban and industrial use, would decrease the rate of water source salination, and will carry the added benefits of saving fuel for heating. In light of the above, means are being considered to limit the use of water-cooled air-conditioning systems.

In yet another study, it was found that disinfection of some 1440 swimming pools in Israel contributes some 6350 tons of chlorides or the equivalent of 10,000 tons of salt to the country's wastewater each year. Based on these findings, the ministry has commissioned a review of disinfection methods in swimming pools, including in situ electrolysis of table salt, to help determine the impact of different methods on salinity of water sources and to help formulate guidelines on both water savings and optimal disinfection. Findings have shown that a switch to electrolysis of salt in all swimming pools may bring about a 30% reduction in salination of water sources in comparison to the present.

Conclusion

The sustainable utilization of effluents requires an integrated approach which combines research, surveys and education with legislation and enforcement. Over the past decade, Israel has placed major emphasis on surveys and research to discover existing and potential polluters, to obtain qualitative and quantitative information on the scope of water contamination, to map areas of soil sensitivity to effluent irrigation, to review and adapt international environmental standards to conditions in Israel, and to develop new technologies for pollution abatement and prevention. Hopefully, as effluent quality is improved, regulations are updated, and education and information are intensified, Israel will emerge as a world leader not only in the percentage of wastewater reclaimed but in the quality of the effluent as well.

Special thanks to Mr. Baruch Weber, Head of the Industrial Wastewater and Fuels Division, for his assistance and to Mr. Enav Oren for the graphs used in this article.

For further information BaruchW@environment.gov.il
REDUCING WASTEWATER SALINITY FROM DETERGENTS

A unique Israeli standard on washing powders will mark a breakthrough in the struggle to reduce the salinity of water sources.

The facts speak for themselves: detergents are major contributors to wastewater contamination in the world, in general, and in Israel, with even greater severity. They are responsible for about 41% of the total addition of sodium, about 7% of the total addition of chlorides and 80-90% of the total addition of boron to municipal sewage. To tackle the problem, a new Israeli standard (IS 438) on environmental and labelling requirements for washing powders was published in 1999, which replaces a standard first published in 1982. Adoption and implementation of the standard mark an important breakthrough in the struggle to reduce the salinity of Israel’s water sources.

Israel Standard for Detergents

The new standard is groundbreaking not only in Israel but in the world as well, although some limitations are known to exist (especially on boron) in such countries as Malta and Cyprus. In Israel, the birthing process was by no means easy. First, laboratory analyses of detergents and washing powders were undertaken in 1997 to determine the pollution levels of different types of detergents, whether regular, compact or liquid (see figures).

Boron, Chlorides and Sodium in the Israeli Standard for Washing Powders in Comparison to the Previous Standard

<table>
<thead>
<tr>
<th>Content</th>
<th>Previous Standard</th>
<th>New Standard &amp; Timetable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron (B) content in laundry powders</td>
<td>12% borate equalling 8.4 grams boron per kilogram of product</td>
<td>8.4 gr/kg product max - until 30.6.1999 7.0 gr/kg product max - from 1.7.1999 5.6 gr/kg product max - from 1.7.2000 4.2 gr/kg product max - from 1.1.2002 3.5 gr/kg product max - from 1.1.2003 0.5 gr/kg product max - from 1.1.2008</td>
</tr>
<tr>
<td>Chloride (as chloride Cl ions) content Powders for washing machines Powders for hand washing</td>
<td>61.2 grams per kilo 121.5 grams per kilo</td>
<td>40 gr/kg product max 90 gr/kg product max</td>
</tr>
<tr>
<td>Sodium (Na) in washing powders Not included. Current content up to 6 grams per kilogram laundry in regular laundry powder (not compact)</td>
<td>5 gr/kg laundry - from 1.7.1999 4 gr/kg laundry - from 1.7.2001</td>
<td></td>
</tr>
</tbody>
</table>
Then, the data were used as a basis for a proposal for a new and unique Israeli standard for detergents. While the proposal was initially met by objections on the part of both manufacturers and importers, recognition of the severity of the problem soon brought fruitful cooperation in a joint effort to find solutions, which included joint funding of surveys by the Ministry of the Environment and the Manufacturers Association of Israel. In time, negotiations led to agreements to reduce both boron and sodium concentrations in regular laundry powders and to reduce the quantity of table salt in detergents marketed in Israel.

The subsequent new Israel standard sets sufficiently long target dates to provide industry with the time necessary to adapt the detergents to Israel's environmental conditions. Industry will be required to reduce boron concentrations by 60% in four years and 94% in up to eight years.

**Anticipated Impacts**

In 1997, about three years prior to the adoption of the new standard, sales of regular detergents constituted about a quarter of detergent sales in Israel. It is therefore estimated that the quantity of sodium contamination will decrease by some 700 tons as a result of the use of regular detergents.

In practice, an even greater reduction is expected. This is due both to the decreasing share of regular detergents in the market and to the fact that the new standard calls for reductions in table salt in all types of detergents as well.

The anticipated reduction in boron contamination from detergents in wastewater is shown in the following graph (Anticipated Reduction in Boron Contamination of Wastewater in Israel). Since it is estimated that detergents are responsible for some 85% of the contamination of wastewater by boron in Israel, it is hoped that the new standard will, in effect, solve the problem of boron pollution.

<table>
<thead>
<tr>
<th>Date</th>
<th>Sodium Contamination (Ton/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 1.7.1999</td>
<td>9570</td>
</tr>
<tr>
<td>Between 1.7.1999 to 1.7.2001</td>
<td>9360</td>
</tr>
<tr>
<td>After 1.7.2001</td>
<td>8850</td>
</tr>
</tbody>
</table>
Household Tips

In parallel to formulating the new standard, the Ministry of the Environment commissioned a research study aimed at discovering whether the recommended doses for detergents used in washing machines in Israeli households may be reduced without adversely impacting the results. A three-and-a-half year study was conducted at the Shenkar School of Engineering and Design to provide the answers. Following are the conclusions:

- In general, washing powders are more efficient under Israeli conditions than liquids (although there are exceptions to this rule as to all of the other conclusions of the study). However, in light of Israel’s salinity problem, liquid detergents are much more environment-friendly. Therefore, from an environmental viewpoint, liquid detergents are recommended for laundry which is not heavily stained for the removal of light stains and perspiration;
- In general, most of the compact detergents, which are environmentally preferable from a salination point of view to regular detergents, are more effective than regular detergents;
- Cleaning capability is determined by the composition of the detergent and the dose of the active ingredient. In most cases, recommended doses may be reduced by half in most powders and by more than half in liquid detergents without affecting the level of cleanliness.
- In all washing powders and in nearly 90% of the washing liquids, raising the dose of detergent above the recommendations of the manufacturers will not enhance the cleanliness level of the wash.
- Doses for specially soiled laundry may be reduced to recommended doses for regular laundry without reducing the cleanliness level.

Special thanks to Mr. Baruch Weber, Head of the Industrial Wastewater and Fuels Division, for his assistance and to Mr. Enav Oren for the graphs used in this article.

For further information: BaruchW@environment.gov.il
Over one hundred air quality monitoring stations, operated by associations of towns for the environment, municipalities, the Israel Electric Corporation and the Ministry of the Environment, painted a bleak picture of Israel’s air quality in 1999.

Nitrogen Oxides

Annual average concentrations of this pollutant ranged between 7 µg/m³ in the Ashkelon area to 129 in the Tel Aviv area. Average annual concentrations in Gush Dan, which encompasses the Tel Aviv metropolitan area, were double those in Ashdod and Jerusalem and up to ten times more than in some other areas of the country. Some 449 exceedances of the half-hour standard (940 µg/m³) were recorded in four stations in Gush Dan in comparison to 51 exceedances in all other stations in the country.

Ozone

Since ozone is a secondary pollutant created downwind and away from direct sources of nitrogen oxides emissions, average annual concentrations in Gush Dan were low (about 42 µg/m³) in comparison to more distant localities such as Karmiel (71), Ariel (84), and Jerusalem (69). A few exceedances of the half-hour standard for ozone were measured in parts of the country which are usually characterized by relatively low annual averages.

Respirable Particles

Annual averages of respirable particulate matter smaller than 10 micrometers (PM10) ranged between 28 µg/m³ in Karmiel to more than 65 in Jerusalem. All stations in which particulate matter is monitored recorded
exceedances of the 24-hour standard (150 µg/m³). These are largely attributed to dust storms which affect Israel during the transition seasons (spring and autumn), especially in the south and east of the country. However, anthropogenic activity cannot be discounted. To identify sources of particulate matter, chemical analysis should be undertaken.

**Fine Respirable Particles - 2.5 PM**

Israel began to monitor fine particles smaller than 2.5 micrometers (PM 2.5) at the end of 1998, within the framework of preparations for setting an ambient standard for this pollutant. Results from six monitoring stations that measured this pollutant in 1999 (in Haifa, Gush Dan and Ashkelon) showed that the annual average ranges between 20-30 µg/m³, (the American standard is 155 µg/m³) while the diurnal average exceeded 65 µg/m³ on several occasions at each station (the American standard is 65 µg/m³).

**Vehicular Pollution**

Results from Israel’s transportation monitoring stations are even more discouraging. Maximum values at roadside level are two to three times higher than at rooftop level and exceedances occur hundreds of times each year on average for each station. The severity of the problem is reflected in the following graph which reveals exceedances of the half hour standard for
nitrogen oxides.

Detailed analyses of monitoring results in two stations in the Tel-Aviv-Jaffa area show that during peak transportation hours in the morning, winds transport the pollutants to the northern part of the metropolitan area before dispersion to other parts of the city and country. In addition, comparisons of monitoring results on Sunday morning and Saturday morning (Israel’s day of rest) reveal some interesting findings. Concentrations of CO on Sunday morning are three to four times higher than on Saturday morning (after reducing background levels as deduced from monitoring results on Yom Kippur). This is attributed to the difference in the number of gasoline-powered vehicles on the road, which contribute some 92% of the emissions of this pollutant. However, a comparison of NO concentrations on the two days shows unexpected results. NO concentrations are more than ten times higher on Sunday morning than Saturday morning. This rise can only be attributed to the absence of diesel-fueled buses and trucks from the roads on Saturdays. The conclusion: diesel powered vehicles are responsible for some 80% of nitrogen oxides measured in these stations.

---

**Facts to Remember**

- Air pollution in Israel’s city centers is very high. High nitrogen oxide concentrations in city centers are largely attributed to transportation emissions, of which some 80% are emitted from diesel vehicles.

- Gush Dan (encompassing the Greater Tel Aviv area) leads in peak concentrations of pollutants.

- Dozens of exceedances of the Israel standard for nitrogen oxides were recorded at rooftop level and hundreds of exceedances were found at road level.

- Different areas in Israel are plagued by high concentrations of secondary pollutants and exceedances of the ozone standard occur.

- Concentrations of respirable particles are high, with particularly high concentrations during dust storms.

- Sulfur dioxide concentrations in most areas of the country are low.

---

On November 2, 2000, Israel took an important step forward in reducing the amount of industrial pollutants discharged into sewage treatment plants. It promulgated regulations for the purpose of “protecting water sources from heavy metals and other pollutants by limiting the volume of wastewater discharged from pollution sources and reducing the concentration of pollutants in it.” The regulations are largely based on PARCOM Recommendation 92/4 on the Reduction of Emissions from the Electroplating Industry.

The regulations, promulgated within the framework of the Licensing of Businesses Law and the Water Law, will come into force on February 2, 2001. Different timetables for implementation of different provisions (ranging between one and four years) were set for existing plants.

Rather than establishing conditions for “end-of-pipe” treatment, the intention of the regulations is to prevent pollution at source, largely through changes in production processes themselves. While the regulations primarily relate to the metal plating industry, the list of 20 pollutants which appears in the annex to the regulations applies to all dischargers of wastewater, including government agencies, hospitals and garages. A core provision of the regulations relates to the multiple use of counter-current rinse water based on either 3-stage cascade rinsing or 2-stage cascade rinsing followed by an additional stage in which the rinse water is recycled. Fewer rinsing stages may be permitted if one of the following conditions is fulfilled: installation and operation of a rinsing system which reduces the quantity of rinse water by over 90%, a wastewater recycling system which reduces the quantity of wastewater by over 90% or a recycling or disposal system for wastewater pollutants which reduces the concentration of the pollutant by over 90%.

**Following are some of the salient provisions of the law:**

- Prohibition on dilution of the wastewater in order to reduce pollutant concentrations.
- Prohibition on the discharge of wastewater to a pretreatment facility before undertaking all reasonable means to reduce wastewater quantities and to prevent and reduce drag out and emissions from the production process to the wastewater.
- Prohibition on the discharge of wastewater which is not pretreated in a pretreatment facility and whose pollutant concentrations exceed those specified in the annex.
- In the electroplating industry, prohibition on the discharge of wastewater in which the concentration of suspended solids exceeds the limit enumerated in the annex.
- Prohibition on the discharge of sludge from a plant except in accordance with the Licensing of Businesses Regulations (Disposal of Hazardous Wastes).

The regulations specify provisions for the installation and operation of infrastructures for the prevention of water and soil pollution, especially with regard to the containment of chemicals to reduce the likelihood of drag out and leaks. If soil pollution in the vicinity of the plant is suspected, soil sampling must be carried out; if soil pollution is discovered, removal of the contaminated soil to a designated area is required.

Specific provisions relate to the following, among others: control systems for regulating the quantity of the rinsing water; longest possible service life of concentrated solutions; specific treatment of wastewater streams containing cyanides, hexavalent chromium, mineral oil, and metal complexes or materials likely to form metal complexes prior to discharge to the pretreatment facility; and separate collection and treatment of wastewater originating in the cadmium plating process to ensure concentrations do not exceed specified limits. Additional requirements set specifications for the pretreatment facility, spare parts, quality control, emergency procedures and wastewater sampling.
INSIDE THE MINISTRY OF THE ENVIRONMENT

Boost to Green Building

As part of its ongoing effort to promote green building, the Ministry of the Environment, in cooperation with The Institute for Research and Development of Educational and Welfare Facilities (a non-governmental organization supported by the Ministry of Education) and the State Lottery, organized a seminar on green building in educational facilities in December. The aim: to present participants with an overview of green building principles, the economic savings associated with them, and means of implementing these principles in schools. Israel’s 3000 educational institutions were deemed to be perfect candidates for implementing these principles, in terms of their environmental, economic and educational potential. Special attention was focused on a planning manual on green building in educational institutes, prepared by experts in Tel Aviv University’s Faculty of Engineering. The manual relates to the building envelope, building orientation, natural lighting, shading, energy-efficient use and building materials.

In a related development, an Israeli Center for Green Building has been established to provide information to developers, architects, engineers, finance institutions and consumers about energy-efficient and environment-friendly building. The Center was set up by the Israel Economic Forum for the Environment in cooperation with the Ministry of the Environment, the Israel Building Center and the Ra’anana-Kfar Saba Environmental Unit. Its creation was marked by a special conference with the participation of lecturers from Israel and abroad, including Mr. Nils Larsson, founder of Green Building Challenge, an international effort to evaluate and improve the performance of green buildings. The Center will continue to organize seminars next year and plans to create an Internet site, which will make information on green building methods accessible to all stakeholders.

Ramat Gan’s Vehicle Fleet to Switch to Low-Sulfur Diesel Fuel

A joint initiative of the Minister of the Environment and of the Mayor of Ramat Gan will see a switch to environment-friendly fuel by the entire diesel-powered vehicle fleet of the municipality. So-called “city diesel” has a much lower sulfur content - 150 ppm as opposed to 350 ppm in regular diesel used in transportation. It is already used by bus cooperatives in Gush Dan (metropolitan Tel Aviv) and Haifa. Plans are currently being advanced to introduce further improvements in fuel quality in the coming year, including further reduction in sulfur content to 50 ppm.

Ministry of the Environment Invests in Recycling

The Environment Ministry will invest some NIS 34 million (over $8 million) in facilities for the recovery and recycling of municipal waste. Some of the facilities will be based on an innovative technology developed by Arrow Ecology Ltd. while others will operate according to more traditional sort and recycle methods. The financial aid, which will be transferred to the municipalities of Hadera and Kfar Saba and to the Drom Yehuda Association of Towns (including the cities of Rehovot, Nes Ziona, Yavne, Mazkeret Batya, Kiryat Ekron and Gan Raveh) will allow for the recovery of 1.1 million tons of municipal waste over the next five years. Minister of the Environment Dalia Itzik has hailed the new development as an important step forward in implementing ministerial policy of reducing the quantity of waste transferred to landfills and promoting recycling. If the present rate of landfilling is continued, existing landfills will reach capacity in less than 3 years.
NEWS IN BRIEF

New Drinking Water Standards

The Minister of Health has signed an amended version of public health regulations which raise chemical standards for water quality to the most stringent standards of the Western world. Maximum levels of 38 new chemical substances - including pesticides, organic solvents and petroleum products - were set for the first time while existing standards for nitrates, lead, cadmium and zinc were tightened. The regulations relate to 75 substances and determine sampling frequencies for different tests. Most importantly, they increase the frequency of complete chemical tests from once in ten years to once in three years. In practice, the Health Ministry has implemented these regulations for some years - closing wells which do not comply with the standards even prior to formal promulgation.

Upgraded Wastewater Treatment Plant in Haifa

Haifa's wastewater treatment plant has been upgraded and inaugurated in a special ceremony held in early December with the presence of the Minister of the Environment. The treatment plant, first established in the beginning of the 1960s, was the first such plant in Israel. It will now be able to treat up to 120 thousand cubic meters of wastewater per day, allowing for the utilization of some 36 million cubic meters of high quality effluents for irrigation of agricultural fields in the Jezreel Valley.

Citizen Panel on Transport

The "First Citizen-Based Conference in Israel" has led to the production and presentation of a Citizens' Panel Report on the Future of Transportation in Israel. The project, by which a group of lay citizens gathered to learn about the issue and to formulate a consensus report about it, was initiated by the Haim Zippori Community Education Center, in collaboration with the Ministry of Transport, Ministry of the Environment and several non-governmental environmental and transport organizations. Recommendations relate to transportation planning, promotion of public transport, development of efficient connections between transportation systems, and citizen involvement. The report should influence public discourse on transportation in Israel and should lay the foundation for enhancing citizen involvement in this and other areas.

Soil and Water Contamination

As a result of groundwater contamination in the central area of the country, some wells have been closed and comprehensive surveys have been initiated to trace the sources of the pollution and find ways to tackle the problem. In one case, a Hydrological Service opinion has confirmed soil and groundwater contamination - especially by chromium and nitrates - in Ramat Hasharon, north of Tel Aviv. In another case, a survey by scientists of the Hydrological Service and Volcani Institute has revealed contamination of a 30-square kilometer section of the coastal aquifer, with the main "hot" spot in the Nahalat Yitzhak area, between Givatayim and Ramat Gan. In light of the findings, building permits in the area will be withheld pending the results of tests to determine water and soil contamination.

Desalination Plan

The Water Commission is preparing a comprehensive plan for desalinating over a million cubic meters of saline water. This will allow for the recovery of some 15 MCM of water for potable water purposes as early as next year - with the rest slated for desalination by 2005. Some six facilities are planned throughout the country in addition to the plant already operating in the southernmost city of Eilat. Meanwhile, the necessary approvals for establishment of the first sea water desalination facility in the Ashkelon area have been completed, and an international tender has been published.
Dear Reader,

Israel Environment Bulletin is continuing to update its mailing list. As you know, the Bulletin has been distributed, free of charge, to thousands of subscribers around the world for over 25 years. It is therefore important for us to confirm that our subscribers are still interested in receiving this publication and to obtain information on change of address or other details.

Please take a few minutes to answer the following questionnaire. You may also wish to use this opportunity to provide us with your comments or feedback on the Bulletin on this form or in a separate page as soon as possible. These will be taken into account in future editions. Please send your reply by mail, by fax or by e-mail.

Please forward the attached questionnaire to: Israel Environment Bulletin
Ministry of the Environment
P.O.B. 34033
Jerusalem 95464
Israel
Fax: 972-2-6535934 or 972-2-6553752
e-mail: shoshana@environment.gov.il

Please tick appropriate box below and complete the form (please print):

☐ Please delete my name from the mailing list of Israel Environment Bulletin:
Name and address as they appear on the Bulletin mailing list: ____________________________
________________________________________
________________________________________

☐ Please renew my subscription to Israel Environment Bulletin:
Name: __________________________________________
Title: __________________________________________
Address: _______________________________________
________________________________________
________________________________________
Fax: __________________________________________
e-mail: _______________________________________

☐ Comments & Requests: __________________________
________________________________________
________________________________________