Summary of the Environmental-Health Document Concerning the Construction of the Desalination Plant in Ashdod

Important Comment

The following document summarizes the environmental–health document and its completion supplements which were submitted to the District Committee as part of the plan documentation. The approved desalination plant plan includes instructions and conditions for additional completion supplements and for the approval of changes to some of the sea- based components of the plan which will be addressed during the desalination plant construction permit phase.

Introduction

Mekorot Development and Enterprise LTD is advancing a plan (No. 124/101/0 2 / 3) for the construction of a sea water desalination plant as part of the program to improve the condition of the Israel water economy, according to which a number of desalination plants are planned to be built along the Mediterranean Sea coast.

The desalination plant is planned to be built on an area that was designated in a National Outline Plan "34 2/B" for the construction of desalination plants. This plant is designed to produce 100 million cubic meters of seawater desalinated water per year.

The desalination plant includes:

1. A desalination facility having a production capacity of 100 million cubic meters of desalinated water per year. The plant is planned to have an area of about 65 dunams. The plant is located at a distance of about 2,700 meters east of the shoreline.
2. The off shore feed pipeline (three pipes, each having an inside diameter of 1.85 meters) that convey sea water to the plant onshore pumping station. The intake heads will be located in the sea at a distance of about 1,450 meters west of the coastline.
3. A brine (concentrate) water pipeline including a brine diffusing structure that disperses the brine water in the sea. The length of the pipeline shall be about 2,000 meters, based on the results of dispersion modeling that will be submitted as part of the documentation for the construction phase permit.

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4. An onshore pumping station shall be constructed at a distance of at least 100 meters east of the coastline.

The environmental-health document was submitted to the Southern District Committee in January 2008 as a part of the plan statutory approval process, based on the requirements of National Outline Plan "34 B 2" and detailed guidelines dated August 12, 2007.

Chapter A – Background Data

Land Uses

The landside area of the plan is located north of the fence of the National Transportation Center and the "Pi Glilot" facility, east of the natural gas receiving station, at a distance of about 2,700 meters east of the shoreline, south of the Retamim waste landfill site and the Ashdod wastewater treatment facility in the jurisdictional zone of the Ashdod Municipality in the Southern District.

The following infrastructure exist at sea in the vicinity of the off shore planned infrastructure to: The south, the Ashdod Port (the Yovel Port), the power station cooling water pool, the fuel marine connections, the emergency outfall of the Ashdod wastewater treatment facility, the Eshkol power station turbines cooling water outfall, two outfall pipelines of the Agan factory and the refinery (a third pipeline is old and is currently used for emergency discharge only), and the natural gas pipelines.

The north is a marine firing range.

Flora and Fauna

In the Landside Environment

The site is adjacent to the existing industrial and infrastructure lands, to the north are the Ashdod sand dunes and open lands that contain a violated but functional ecosystem. The fact that the site is adjacent to a built-up area lessens to a minimum the disruption caused by the removal of an open area and its transformation to a built up area.

The area of the plan is violated, sand is excavated illegally and the area was leveled down to the coarse gravel infrastructure.

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There exist few remains of natural vegetation; most of the area is dominated by invasive vegetation (acacia saligna and camphorweed). In the plan surroundings there was found to be a large activity of two decreasing species: deer and partridges.

In the Coastal Environment

The coastal environment in the plan area is a violated coast and abundant in infrastructures for many years.

The coastal habitat in the plan area is impacted by its proximity to the sea, the salty sea water aerosols impact the vegetation that is found in the immediate vicinity of the shoreline.

The first vegetation belt consists of the prickly saltwort and the coastal morning glory plant. The second vegetation belt, the sand dropseed and the silver birds foot trefoil. The third vegetation belt is dominated by acacia saligna shrubs and trees, desert retama and sand wormwood shrubs.

In this habitat many animal species exist such as the sand snake, the sand lizard, the greater Egyptian Gerbil, Buxton’s Jird, the lesser Egyptian Jerboa, seagulls, migrating birds, and more.

In the Marine Environment

Animal and vegetation populations originating in various geographical areas exist in the Mediterranean Sea opposite the Ashdod coast. Most of the species originate in the Atlantic Ocean and the Mediterranean Sea, however, in the last few decades (as a result of the opening of the Suez Canal), the proportion of invasive species originating in the Red Sea is gradually increasing. The salinity of the eastern basin of the Mediterranean Sea is higher than that in the western basin, and approaches the salinity of the Red Sea, which explains the penetration and stabilization of the tropical species.

The sea floor in the area of the plan and its immediate vicinity is sandy. The sand is not stable in places where there is a strong water current. The unstable sand is not a convenient habitat and it is sparsely populated by small animals burrow inside it.

Survey of Sea Water Pollutants

The marine area in the plan domain is a violated area that does not represent a natural environment. In its vicinity there are entities that possess the potential for causing pollution, such as: The Ashdod Port, The Eshkol Power Station, an industrial area, an outfall to the sea of treated wastewater from the Agan Chemicals factory and the Ashdod refinery, fuel tanker connections, the Ashdod wastewater treatment plant, the outfall of cooling water from the Eshkol Power Station, cooling water from the "Ashkogen" Company, and brine waters from Israel Electric Company "Gezer". Each of these impacts the marine environment.

As part of the process of preparing the environmental document, background monitoring of the marine environment was performed in October 2007 by the Israel Oceanographic and Lake Research Institute (IOLR). The report constituted a completion supplement to the environmental document that was submitted in January 2008.

The objective of the background monitoring was to characterize the sea water quality, the sea bed and the biota in two areas: the area in which the concentrated brine will be discharged from the future desalination plant, and in the area in which raw water will be drawn to the desalination plant. This characterization will be used subsequently as a reference baseline for assessment of the impacts on the environment of the concentrated brine discharge, and for monitoring possible spatial, temporal and informational changes concerning the quality of the sea water that is pumped to the facility as raw water.

The monitoring findings indicated that all the parameters that were examined were within the natural concentration ranges that are characteristic of the area with no deviations from the recommended sea water standard of the Ministry of Environmental Protection. Volatile organic substances were found at all points that were sampled, but at low concentrations and with no correlation with the location or depth in the sea.

The marine environment in the area of the plan is monitored on a permanent basis pursuant to the conditions of the permits for discharging to the sea by the Ashdod refinery, Agan Chemicals and by the Eshkol power station.

Drainage and Hydrology

- The land in the area of the facility is included in the land group defined as "sand dunes".
- The altitude of the ground surface varies from 1 meter at the coastline at the western end of the feed and brine pipelines, to 14 meters in the area of the production units of the desalination facility.
- The height of the groundwater level in the area of the plan is in the range of 1 – 2 meters.

- The groundwater flow direction in the aquifer is from east to northwest, west and southwest.
- The flow gradient is relatively moderate.
- The hydrological sensitivity to pollution from the site surface is high.
- The plan area is located in a region that is drained to the sea by dispersed flow rather than by means of rivers.

Seismic Conditions

- The horizontal ground acceleration in the hard rock layer is 0.09, according to the seismic acceleration map for Israeli Standard SI 413.
- There are no shifts that are suspected as active within the plan area and/or its environment.
- In the plan area and/or its environment there is no danger of development of drifts, flow or creeping of land/rock mass.
- Within the plan area there is no danger of the development of liquefaction as a result of an earthquake.
- The site seismic survey findings indicated that there is no exceptional seismic risk, therefore there is no need to perform a comprehensive seismic study, and the desalination plant buildings are to be constructed as required by Israeli standard SI 413.
- The plan area will not be affected by a tidal wave (Zunami) impacting the Israeli coastline.

Chapter B – Plan Description

The following plan description corresponds to the principle design phase as required for the Urban Building Plan Approval phase. The detailed design will be completed after the approval of this plan - Urban Building Plan.

The desalination process of the subject facility is based on a reverse osmosis process and is designed for a production capacity of 100 million cubic meters per year.

The system components are as follows:

1. Seawater feed pipeline. Three parallel pipelines having a length of about 1,450 m at sea, will be placed about 50 meters south of the natural gas pipelines. The inside

diameter of each pipeline will be 1,850 mm. and the pipelines will be suitable for conveying a maximum flow rate of 52,000 cubic meters per hour.

1. Intake heads of the pipelines will be installed at a height of 6 – 7 meters above the sea floor and at a minimum distance of 50 meters from each other, at a point in the sea that is about 15 meters deep.
   At the landside end the pipelines will continue for a distance of about 100 meters from the shore to the pumping station and from there they will continue for a distance of about 2,700 meters to the desalination facility.
2. Raw water coastal pumping station. The installation is designed for a pumping capacity of 40,000 cubic meters per hour at maximum production capacity. The facility will be used to receive sea water and pump it to the desalination plant.
   The station will be located at a distance of at least 100 meters from the coastline.
3. Brine Pipeline. The purpose of this pipeline is the removal of brine that is produced as a byproduct in the desalination process. It starts at the desalination plant, it continues westward into the sea in parallel with the raw water pipeline. This pipeline will gravitationally convey a flow of up to 30,000 cubic meters per hour of brine and rinse water.
   The sea portion of the pipe will have an internal diameter of 1,850 mm and its length will be determined according to the results of the dispersion model.
4. Desalination plant having a production capacity of 100 million cubic meters of desalinated water per year, with a chlorides composition of 20 mg/liter, and a boron composition of 0.28 mg/liter. The desalination process consists of the following process stations: Preliminary treatment that includes gravitational and micronic filtration, sea water desalination, product water treatment, followed by water hardening and stabilization.
   For proper operation of the desalination systems, a number of support facilities are installed: a membrane chemical cleaning station, a transformer station, an electrical room, a control room, a laboratory, storehouses and work buildings.

Plant Design and Operational Principles

Seawater is received at the three intake heads that are placed at a depth of 15 meters, some 1,450 meters from the shore, and separated from each other at a distance of about 50 meters at least. Many samplings and tests were performed in order to locate an intake point having high water quality. The point that was selected for seawater intake is the point that was distinctly found to have the cleanest water.

From the intake heads, the seawater flows to the pumping station on the shore through three 1,850 mm diameter HDPE pipes that are suitable to convey a maximum flow rate of 52,000 cubic meters per hour. The pumping station concurrently draws the water into two gravitational sand filters. As part of the design process, two seawater technologies for filtration prior to feeding to the membrane system were examined – one by means of ultra-filtration (UF) and the second by means of sand filters. The sand filter technology was selected based on economic considerations.

Coagulants and flocculants are added to the water in the filtration stage to expedite the nucleation of the particles suspended in the water. The rinse water is collected in a holding tank having a volume of 1,000 cubic meters and is returned at a constant rate to dilute the brine water.

The filtered sea water is pumped to the first degree reverse osmosis system for creating salt-free water.

The brine of the reverse osmosis system flows to the brine water pipeline. During the design phase, two options for conveying the brine were examined, one using the cooling water ducts of the Eshkol power station, and the second, which was the alternative that was selected, direct flow through a pipe to the sea.

The brine pipeline will gravitationally convey a flow of up to 30,000 cubic meters per hour of brine water and rinse water.

The SWRO permeate is divided into two streams, the good quality water is diverted directly to the final treatment system for adding hardness and for pH correction. The water having the lower quality continues to the second pass, which consist of three stages the purpose of the second pass is to reduce the boron level to less than 0.28 ppm and reduction of the chlorides level to below 20 ppm. A portion of the permeate stream from these stages is entrance to the hardening system that is composed of two series of 6 identical pools (eastern and western). The pools contain limestone for dissolution into the product water. Before entering the hardening pools, CO_2 gas is injected into the water for reducing the pH level. At the end of the process the pH level is corrected by injecting caustic soda.

The product water leaving the hardening pools is collected in product water tanks having a volume of 3,200 cubic meters and then fed into the Mekorot, (the national water company) reservoir.

Description of Construction Works

The desalination facility is designed to be built within a period of about 30 months from the time of approval by the State and closure of the project financing package.

The facility landside area organization works will include:

- Soil leveling and area preparation works
- Foundation drilling and pouring of foundation walls
- Construction of concrete structures, a task which includes-
    - Adjusting the ground levels to the heights needed for the structure.
    - Installation of underground piping
    - Pouring of floors
    - Construction
    - Building finishing works
    - Assembly and first operation of the necessary equipment
    - Light Buildings

The process of constructing light buildings is similar to the process of constructing concrete buildings except that the construction process is performed by constructing a metal frame and attaching a light covering material to it.

The offshore construction works will include:

- Installation of HDPE pipes: During the preliminary design phase two methods for installing the sea piping system were examined, one method by means of open excavation, and the second by forced insertion. The open excavation method was selected since this method uses HDPE piping which is preferred from the following standpoints:

resistance of the piping to corrosion and the fact that the inside wall of the pipe being smooth and continuous, a property which facilitates easy cleaning.

The pipeline route from the pumping station to the intake and brine diffusing structures shall be divided into two sections: (i) Wave breaking zone (from the shoreline to a water depth of about -5.50m) shall be excavated, between a driven sheetpile cofferdam, using a conventional excavator; (ii) Deep water zone- using an offshore THSD dredger

The pipe will be anchored to the sea floor by means of concrete sinkers. Upon completion of the pipelines submersion, the pipes shall be covered with the local pre-excavated material.

- The intake structures: The structures shall be installed and connected to the pipelines. Scour protection, shall be installed around each intake head.

Quantitative and Qualitative Data Pertaining to the Brine

The plant is expected to draw about 250 million cubic meters of sea water per year.

During the sea water reverse osmosis process (first pass), brine is produced having a saline concentration of TDS = 70,000 – 80,000 mg/L, depending on the process recovery ratio.

The capacity of the brine that is expected to be discharged to the sea is about 150 million cubic meters per year or about 408,000 cubic meters per day (average value) and up to 24,000 cubic meters per hour (maximum value). For partial productions the daily flow rate of brine is lower.

The plant brine and rinse water flow rates are presented in the following table.

Stream source	Max. hourly capacity	Min. hourly capacity	Average capacity
	M^3/hour	M^3/hour	M^3/hour
SWRO (Pass 1) Brine	22,800	3,979	17,515
BWRO (Pass 2) Brine	1,180	206	906
Back Wash of Media Filters	800	140	615
Back Wash of LimeStone			50

The brine water contains salts that originate in the feed water and, in addition, various chemicals that were used in the desalination process.

The expected composition of the brine water relative to the sea water composition is presented in the following table.

Parameter	Brine Water * mg/L	Sea Water "Background", mg/L
Ca	775	442
Mg	2,826	1,499
Na	21,313	12,171
K	1,571	671
Ba	0.01	0.006
Sr	11.2	6.4
NO_3 as NO_3		<1
NO_3 as N		<1
NH_4^+ as NH_4^+	0.21	0.12
NH_4^+ as N	0.16	0.09
HCO_3	276	163
SO_4	5,358	3,056
Cl	38,810	22,159
F	2.6	1.5
B	8.9	5.3
SiO_2 as SiO_2	1.75	1
SiO_2 as Si	0.82	0.47
TDS	70,379	40,180
PO_4 as PO_4	0.02	0.01
PO_4 as P , Whose source is the precipitation inhibiting material of the second pass	0.11	

pH value	8.4	8.2
Fe whose source is in the sea water and the coagulant	0.58	0.0

* The concentrations of the various elements in the brine water are the data that were obtained for process computer projections with a recovery ratio of 43% and with the maximum feed flow rate.

Additives

The list of additives that was presented in the framework of the health-environmental document is for estimation only. The list will be revised as part of fulfillment of construction permit requirements.

The following table presents the list of additives and their intended use.

Material Name	Designated Use
Hypochlorite	Raw water disinfection
Sodium Bisulfite	De-chlorination
Anti-scalant	Precipitation inhibiting material to prevent chemical precipitants on the membranes
Polymer	Flocculent whose purpose is improvement of filtration system efficiency
$Fe_2(SO_4)_3$	Coagulant whose purpose is improvement of filtration system efficiency
H_2SO_4	pH correction in process stages
NaOH	Increase pH value at various process stages and neutralization
Limestone	For hardening and addition of alkalinity
Hypchlorite	Completion of disinfection
Carbon Dioxide (CO_2)	For hardening and addition of alkalinity limestone dissolution process

Chapter C – Expected Plant Environmental Impacts

Impacts on the Marine Environment

During Construction

- Offshore excavation works cause the suspension of sand and as a result, there is an increase in the turbidity and decrease in the penetration of light that is liable to disturb organisms that lack independent movement capability (autonomously mobile organisms distance themselves from the point of disturbance). The turbidity decreases within a short period of time after the conclusion of the works and the seascape recovers.

- During pipeline shore installation works there may be a temporary impact on aquatic organisms, since the shallow sea area is populated by living organisms and/or those that burrow in the sand such as crabs, snails, etc. The excavation process will expose buried species and mechanically disturb them (it is likely that autonomously mobile species will distance themselves from the excavation area).

- Sea pollution that is liable to occur during works at sea, such as: dragging, erection of barges, etc. Oil and fuel leaks will be prevented by strict observance of all relevant laws and regulations by the executor of the project.

During Operation

- No impact is anticipated on sand movement, which occurs mainly in the area of breaking waves (this area reaches a water depth of 6 – 8 meters), since the feed pipeline is buried along its entire length and the intake head will be located at a depth of 15 meters.
- In the framework of the environmental document that was submitted in January 2008, two alternatives were examined for concentrated brine removal:
  In the first alternative, the brine water is removed using a dedicated pipe that will be installed in parallel with the raw water pipes to an offshore distance of about 600 meters.

In the second alternative, the brine is removed by conveying it to the Eshkol power plant cooling water discharge duct.

Within the context of the environmental documentation, the Israel Institute for Oceanographic Research at the Technion performed three dimensional simulation modeling that examined the concentration gradients that are expected for varying sea conditions and operational regimes, when conveying the brine to the Eshkol power station cooling water discharge duct. The modeling results indicated that:

- The dispersion of brine at such a distance from the shore, when adding to it the coastline flow that is directed from south to north, is rapid.
- The region of salinity that is high in the vicinity of the discharge port and decreases until it reaches equalization with the natural sea environment, is expected to extend to only a few hundred meters.
- The impact on the variety of biota in this area is limited only to the area in which the salinity is higher than its surroundings.

Subsequent to submittal of the environmental document, the plan and the alternative consisting of brine removal by conveying to the Eshkol power station discharge duct was disqualified, and the adapted solution is using a dedicated pipe that will be installed in parallel with the raw water pipes to an offshore distance of about 2,000 meters.

An updated model that will examine the new design situation will be submitted as part of the plan documentation during the construction permitting phase and will be approved by the planning institutes.

- Sea water contamination with iron and chemical substances that are used in the desalination process.

In addition to a high concentration of salts, the brine water also contains chemical substances that are used in the desalination process and iron which originates in the filter backwash rinse water in the plant feed water preliminary treatment phase. In order to minimize the potential for environmental damage, only additives that are environmentally friendly chemical substances will be used in the desalination process.

The brine water also contains iron that originates in the backwash rinse water. Based on the professional assessment of Prof. Yuval Cohen, it is apparent that under the hydrodynamic conditions that exist in the area to the north of the Ashdod port, there will be no damaging impacts to the marine ecosystem due to the discharge of the backwash rinse water without the removal of solids, both in the short term as well as in the long term. The aesthetic impact will also be much less than that observed currently in the vicinity of the Ashkelon plant.

Nevertheless, execution of the plan to expand the Ashdod port is likely to cause a change in the hydrodynamic regime in the plan area that may require treatment of the rinse water.

- The design value of the suction flow velocity to the intake heads is 15 cm/sec.

  This flow velocity does not harm the biota in the sea, aquatic fauna develop on the rocks that support the intake head on the sea floor and on the screens that protect the intake ports.

  Aquatic animals having autonomous mobility will distance themselves from the intake head area and will learn to not approach it. The plankton organisms are expected to be trapped at the intake head (in a negligible quantity compared to the quantity of plankton in the sea).
- Routine land side facility maintenance works are not expected to impact the marine environment. Offshore facility maintenance works mainly include cleaning activities:
  - Cleaning of the screens on the intake heads is performed by divers and does not negatively impact the environment.
  - Cleaning of the intake pipes by means of a pig will release organisms to the sea that developed inside the pipe and the intake head. The residues of these organisms are expected to enrich the surroundings with foodstuff materials for fauna in the vicinity. The currents and the animals in the surroundings and on the sea floor will quickly “clean” these residues, so that the impact on the marine environment in the area of the cleaning will be very brief.

Impacts on the Shore Environment

The shore environment in the plan area is violated. The electric and gas companies, Agan Chemicals, the Ashdod refinery and the Ashdod wastewater treatment plant constructed their facilities in it and its surroundings over several decades.

The pump house that will be located more than 100 meters east of the shoreline is liable to harm the open landscape continuity of the coastline north of the power station.

Impacts on the Landside Environment

During Construction

The construction of the desalination plant will remove an open sand dune area and will therefore constitute local environmental damage. Since the plan environment is violated anyway, implementation of the plan poses no threat to the continued existence of the ecosystem that is currently thriving in the plan area.

During Operation

- Some of the materials used in the desalination process are defined as hazardous substances. There are laws and procedures that regulate their transport, storage and use. The plant will be required to fulfill all requirements for safe process operation.
- There are no land users that are sensitive to noise within a radius of at least 2 km. from the plant. Nevertheless, the plant will fulfill all requirements of the Prevention of Nuisances Law (Unreasonable Noise). An acoustic analysis and corresponding design will be performed during the detailed design phase.
- Improper infrastructures are liable to cause leakage of sea water, brine or chemicals to the ground or groundwater and to pollute them.

In light of the high sensitivity of the site, the plant infrastructures will be built using the best means to prevent leaks and overflows, such as: impermeable surfaces, double walled tanks and piping containment basins, systems for collecting and treating leachates, and means for monitoring leaks as required by law.

Widespread environmental impacts

Beyond the local impacts reviewed above, there are widespread positive environmental and economic impacts that support the construction of the desalination plant:

Reduction of the Water Shortage

The demand for water grows continually, both because of the constant increase in population as well as the constant increase in the standard of living. This phenomenon causes an imbalance between supply and demand in the Israel water system.

Based on the fact that every few years the area suffers from a series of drought years, the government adopted a plan to improve the water system, according to which several desalination plants will be built along the Mediterranean coastline, of which the subject plant is one such facility.

Reduction of the Damage to Water Sources

The water shortage necessarily brought about the adoption of a policy of over-pumping of water, so that the water levels in surface and underground reservoirs dropped in recent years to the red lines and even below them. This policy is one of the causes of the damage to the quality of the water reservoirs (salination and contamination).

International Agreements

According to international agreements, Israel must allot 185 million cubic meters per year to its neighbors, 35 million cubic meters to the Palestinian Authority and 150 million cubic meters to Jordan. This quantity constitutes about 10% of the amount of natural water that Israel possesses.

Natural Needs

In August 2000, the government of Israel decided to supply some 50 million cubic meters of water per year for natural purposes, for restoring rivers and water reservoirs.

Improvement of Water Supply Quality

Desalination on a large scale will lead to an improvement in the water supply quality, and a decrease in salinity and nitrates levels. Low nitrate desalinated water will enable dilution of well water containing a high nitrate level. This reduces/eliminates the need to construct well water treatment plants.

Production of "Soft" Water

The hardness level of desalinated water is low. The implications of supplying soft water are:

- Less accumulation of lime scale that will bring about energy savings and extended lifetimes of heaters and water transport systems.
- Reduced use of detergents and water softeners.

Chapter D – Means of Preventing Environmental and Health Hazards

Means for Minimizing Negative Impacts on the Marine Environment

During Construction

- The duration of offshore works execution will be minimized so that it will be possible to reduce to a minimum the duration of the unwanted impacts during construction.
- Locating the organization areas as far as possible from the water pipeline.
- Storage of the excavated material from the offshore excavation and from the temporary startup installation in the sea in a temporary offshore storage pile, in a zone that will be defined in the construction permit request.
- Marine vessels that will perform the work will take all appropriate steps to prevent sea contamination in accordance with all laws.
- Equipment for blocking and absorbing fuel in the sea will be available at the site, at least in the following quantities:
  - Blocking-absorbing sleeve: having a length that can encircle the largest marine vessel at least one and half times.

- A container of sponge pillows
- A container of absorbent towels
- When placement of the pipe in the shallow water is finished, the temporary startup installation will be disassembled and the piles will be removed in order that no waste will remain on the sea floor.

During Operation

- The plant pipes will be buried to a depth of at least 1 meter under the sea floor so any impact on the movement of sand on the sea floor shall be prevented.
- The location of the concentrated brine and its components, including their calculated concentrations, will be determined at the time of building permit issuance based on the results of concentrated brine dispersion modeling.
- The sea water entry velocity to the intake head will not exceed 15 cm/sec, in order to prevent any impacts on the sea floor.
- The intake head will be installed at least 4 meters below the sea surface and at least 4 meters above the sea floor.
- In order to prevent sea pollution impacts due to iron oxide whose source is the filter backwash water, this water will be collected in a dedicated tank having a volume of 1,000 cubic meters that will be emptied in a controlled manner into the concentrated brine pipeline.
- Desalination process additives that are liable to negatively impact the sea and its biota will be treated landside.

Supervision of Raw Water Quality

Sea water pollution is harmful to the desalination process. Therefore it will be necessary to supervise and enforce the Sea Water Pollution Prevention Regulations.

A procedure will be prepared for operating the facility during time of seawater pollution. Currently a system is operating for reporting and treatment of seawater pollution that includes the staffs of the port, the power station, the Ministry of Environmental Protection and other entities, depending on the severity of the incident. The desalination facility will be integrated into this reporting system.

A warning system will be installed in the area of the intake head for warning regarding any change in sea water quality.

A background monitoring plan was approved for implementation by the Marine and Coastal Branch of the Ministry of Environmental Protection in coordination with the Ministry of Health. Background monitoring sampling was performed in the fall of 2007 and a report of its findings was submitted in May 2008 in a document that supplemented the environmental document. Within the framework of the request for building permit, a monitoring plan for the marine environment will be submitted and will include instructions regarding the mechanism for reporting to the Ministry of Health and the Ministry of Environmental Protection regular reports and for plant operator actions during exceptional sea water pollution incidents, process and product water quality deviations or desalination plant malfunctions, for the approval of the Ministry of Environmental Protection and the Ministry of Health.

Means for Minimizing Negative Impacts on the Coastal Environment

The main coastal environmental impacts that are anticipated are related to the landscape/appearance aspect. This issue will be addressed by a landscape architect during the detailed design phase.

Means for Minimizing Negative Impacts on the Landside Environment

During Construction

The steps that will be taken in order to minimize possible negative impacts on the land side environment as a result of the construction and operation of the installation will be as follows:

- Prevention of noise nuisances and vibrations during construction:
  - The working hours will be as specified in the Prevention of Nuisances Regulations, (Prevention of Noise) 5753 – 1992.
  - Mechanical systems and/or construction equipment will comply with the requirements of the Prevention of Nuisances Regulations (Unreasonable Noise from Construction Equipment), 5739 – 1979.

- In order to prevent dust and dirt nuisances on the nearby streets and access roads, trucks will be required to be covered as one of the permit conditions.
- The fuel tanks will be placed inside spill containment basins that meet standards, having containment volumes equal to 110% of the tank volumes. Refilling of the mechanical equipment will be done with care to prevent overflow from the tank. Tank filling and refueling will be done within the containment basin.

During Operation

- The operator will be obligated to comply with the maximum noise level criteria permitted according to the Prevention of Nuisance Regulations (Unreasonable Noise), 5750 – 1990.
- Hazardous materials will be stored in quantities required for use in continuous operation only. Hazardous materials will be stored in accordance with regulations and the technical instructions of the various governmental offices. Compliance will be maintained with the requirements of all the authorities and the Ministry of Environmental Protection within the framework of business license issue and toxics materials permit.
- Protective and safety means will be installed in order to permit an immediate response in case of an emergency incident on the site.
- All tanks and chemical dosage equipment will be located inside spill containment basins having volumes equal to 110%, which are coated with materials that withstand corrosion and seepage.
- Run-off water will be directed to infiltration in the adjacent sandy area. Run off water from areas within the facility that are liable to be polluted will be transferred to an oil/fuel/water separation device.