Minimizing environmental risks on constructing marine pipelines: Aguilas desalination plant

Beatriz Arconada*, Patricia Delgado, Ángel García

Agua de las Cuencas Mediterráneas, S.A. (Acuamed). c/Albasanz, 11, 28037 Madrid, Spain
Tel. +34 (91) 4234500; Fax +34 (91) 4234547; email: barconada@acuamed.es
Received 15 May 2012; Accepted 18 July 2012

ABSTRACT

In the building of marine brine discharge pipelines from desalination plants, there are some technical and environmental conditions that require previous numerous studies to guarantee their viability. In the project of Águilas desalination plant with a production capacity of 180,000 m³/day, in Murcia, Spain, a marine emissary was designed. It was made up of various sections that entail different building complexities. The main difficulty was to build a tunnel in the rocky massif called “Peñón del Roncaor”; the tunnel was dug through a piling of 443 m of length and an exterior diameter of 2.400 mm that would have come up at a depth of 12 m to join the submarine section of 290 m of length. These more detailed geotechnical studies showed a great heterogeneity in the composition of the materials to be excavated from the Peñón. In order to avoid any risk of affecting to the castle right above considered of cultural interest, a new tracing of the tunnel was designed. The new tracing runs the Peñón’s outer south borders right into the dumping area. This new tracing implies greater length of piping and greater seabed marine area occupation as well; it required carrying out additional bionomic studies to guarantee its environmental compatibility. We must bear in mind that the marine surroundings of Águilas are a protected area included in the Red Natura 2000 (LIC Submerged Costal Strip of the Murcia Region) whose predominant bionomic community is the Posidonia oceanica beds, limited to the Southwest by another less dense seagrass of Cymodocea nodosa. These seagrass meadows and rock communities suffer anthropic pressure for its proximity to the city of Águilas, as near-shore marine discharges, fishing activity, and others. And, there are other affections of natural condition: terrigenous sediments and nutrients that get to the dry riverbed name El Charco, having seriously affected the species of greater natural value and the implementation of those ubiquitous species, and thus impoverishing habitat in general. Due to the fact that P. oceanica seagrasses have very low tolerance to increased salinity in the western Mediterranean Sea; a hydrodynamic model was developed to estimate the likely dilution of the brine discharge for this new solution. Other works comprise a bathymetric survey to establish the profile of the ocean bottom—very important for pipeline construction—a sediment characterization, the study of the oceanographic conditions and a monitoring study of the marine water quality to settle the values of the water quality in the preoperation moment and the parameters needed for process designing. During the construction of the pipeline, an environmental surveillance program was developed. And at the end of the stage, a study was developed to know the impacts produced by the works carried out and to establish the “zero situation” before start...
of the operation phase. In addition to that, a very strict environmental legislation was applied along the process. These regulations included exhaustive and systematic controls of several environmental parameters when starting and during the plant operation.

*Keywords: Desalination; Brine discharge; Environmental impact; Seagrass meadows*