DESIGNING OF A SALTWORKS FRIENDLY TO ENVIRONMENT

D.S. JHALA

Chairman-Dev Salt Pvt. Ltd (Salt Producer & Consultant)
President – Indian Salt Manufacturers Association
CAB (Salt) Member Govt. of India
(88-Panchvati, Bedi Road, Jamnagar (India) 361002)
E-mails:dsjhala@bilt.com; devsalt@sancharnet.in

EXTENDED ABSTRACT

While designing a new salt works or modifying the design of existing salt works the main concern is productivity and quality. This paper gives a different thought to design a salt woks keeping in view to make salt works friendly to environment. The author has redesigned a salt works in India with above idea and made friendly to environment. “Salt Industry is friendly to Environment, provided salt works is designed keeping in view surrounding environment such as marine life, seaweeds plants, sweet water sources and agriculture fields. The location of concentrated brine & bittern ponds and crystallizer area is very important in salt works. If locations of above are not proper this can have adverse effect on environment. After extraction of salt, the process to discharge the bittern in to sea is equally important. It is explained in the paper to dilute the bittern before discharging in to sea. The operations of a properly designed salt works are friendly to environment. Such salt works attracts lot of birds, increase wetlands area and shelter to birds; it become like a bird sanctuary. The design aspects of such salt works are explained in the paper.” This paper gives basic principle to design solar salt works friendly to environment.

Keywords: Marine life, Sea weeds, Bittern, Wetlands, Deg. Be, Brine, concentrated brine,

INTRODUCTION

Designing and layout of a salt works is very important to make the salt industry friendly to Environment. If the salt works is not designed properly, it could have a very adverse effect on the environment. The location of a salt works is also very important however, while designing a salt works it is important to take in view high density brine should not come in the contact of external boundary of salt works to minimize its effect on neighboring agricultural land, on seaward side mangrove plants (seaweeds) and marine life. The underground sweet water stream flow direction should also be taken into consideration. Normally near sea coast it is from landward to seaward.

Here first we are discussing how a faulty designed salt works can adversely affect the environment. The following is a wrong layout of a typical salt works. In the following diagram, the 1st and 2nd compartments are of low density whereas the 3rd and 4th compartments are of high density. The bittern is directly discharged to sea through a creek. If this discharge is during low tide, the dilution of the bittern by sea water is minimized. The marine lives which come directly in contact of bittern / mixture of bittern and sea water of high density; are affected due to high density and salinity. In this location, the sea water source is towards north, the agriculture and private land is towards

south. The seaweeds on both the sides of the salt works could be affected due to leakage of concentrated brine from the 3rd and 4th compartments. The agricultural land and sweet water in the vicinity of salt works could be affected due to leakages and seepages of concentrated brine.

The location of salt works is also very important. If it is interior on landward side and on high level ground and that too in sandy soil than there are more chances of adverse effect on agriculture land and as well as on bore well-water in the vicinity of salt unit.

In India some times, above problem leads to other problems from local people / villagers. Such things become difficult to manage.

While designing a salt unit of very big size, an impact study should be done for closing the intermediate / surrounding big creeks by expert of this line or by a person having long experience in construction of salt fields. Some times by closing creeks the sea water availability may be affected for the unit. An experienced salt person takes all such precautionary measures to continue the circulation of sea water. Other wise there are all chances that in long run the disconnected creeks i.e. without complete circulation of seawater would be silted up and the salt works will face shortage of raw material (sea water)

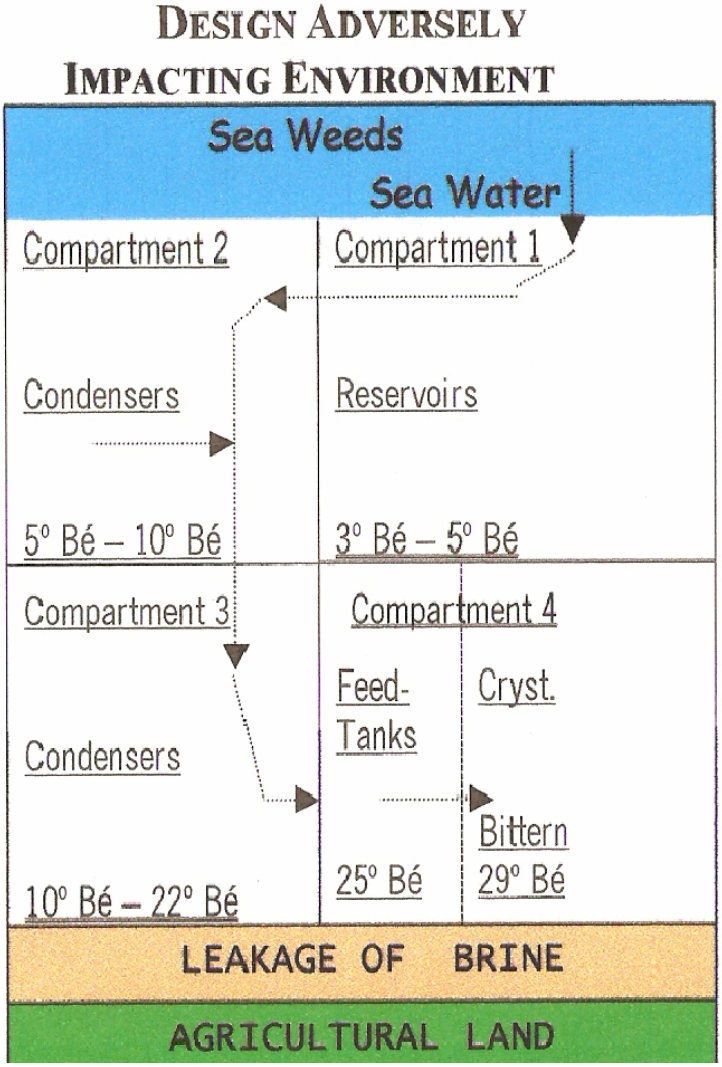

Figure 1

The above adverse affect could be avoided by paying some attention on designing of salt works keeping in view environment. So now we will discuss the following layout of an ideal salt works friendly to environment, which will not have any adverse effect on environment.

METHODOLOGY

In the following layout, you will observe concentrated brine is away from outside boundary and a surrounding channel is provided. Hence the salinity of concentrated brine / salt / bittern will not have any direct effect on the surrounding sweet water sources, agricultural land or seaweed. Bittern storage pond is provided for storage of bittern. During salt works operations, dilute/concentrated brine leaked from salt works will go to the sea and during rains, the same channel would be useful to drain out flood water. This will minimize damages to salt works by floodwater. Instead of discharging bitterns directly to sea, which could affect marine life, the bitterns should be diluted and thereafter it should be discharged at the time of high tides. This we will discuss in the following paragraphs in more detail.
During salt works operations, dilute/concentrated brine leaked from salt works will go to the sea and during rains, the same channel, would be useful to drain out flood water.

RESULT

This will minimize damages to salt works by floodwater. Instead of discharging bitterns directly to sea, which could affect marine life, the bitterns would be first stored in a pond and it would be mixed with seawater. The concentration of bittern would be reduced. That mixture could be discharged into the sea. This will not have any adverse effect on marine life and seaweeds.

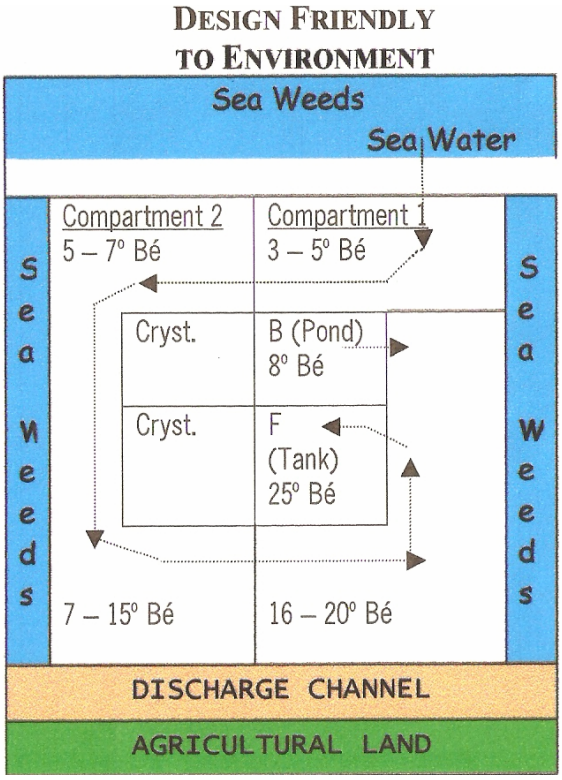

Figure 2: Lay out of a salt Works Friendly to Environment

In such salt works, seaweeds can be planted near outer bunds towards the sea side in tidal zone. This will protect the outer bunds from seawater wave actions, particularly

during Cyclone. The stone pitching for protection of the bunds can be avoided. The plantation of seaweeds should be encouraged in vicinity of salt units. In last killer tsunami the villages surrounded by seaweeds had minimum impact. The salt works which are in tidal zone area can save lot on stone pitching etc. by growing seaweeds around their outer embankment. In following figure the seaweeds are being planted in a salt works area.

Figure 2: Plantation of Seaweeds near a Salt Works embankment

Discharged bitterns contain other chemicals such as bromine and magnesium salts. It is desirable; such chemicals should be recovered from the bitterns before discharging to the sea. The salt works based on above principle and design will have a good biological system, which will help to improve production. Such salt works will attract lots of birds, and shrimps too will come in with the tidal water, which will attract the birds particularly flamingoes. Such salt works, should be encouraged by governments of various countries. The following photograph shows the flamingo in a salt works.

Figure 3: Flamingoes in 'Dev Salt' reservoir

CONCLUSION

The properly designed solar salt works would be friendly to environment. No adverse effect on agriculture or bore well water in the vicinity of salt works. The big salt works can develop bird sanctuary in big reservoirs. This can become the attraction of tourists. The small cottages could be provided in big reservoirs for tourists.

REFERENCES:

Davis J.S.(1980) : Biological Management of Solar Salt Works, *5th Symposium on salt* Volume1:265-268

Davis J.S. Importance of Microorganisms in Solar Salt Production,*4th International Symposium on Salt-Northern Ohio Geological Society* page 369-372

Jhala D.S. (2000), Salt Industry And Environment, *8th World Salt Symposium* page 1295-96