

# Varberg Radio Station (Sweden)

No 1134

## 1. BASIC DATA

*State Party:* Sweden

*Name of property:* Varberg Radio Station

*Location:* County of Halland

*Date received:* 21 January 2003

*Category of property:*

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a *monument*.

*Brief description:*

The Varberg Radio Station at Grimeton in southern Sweden was built in 1922-24. It is an exceptionally well preserved monument to the early phase of wireless transatlantic communication system. The site consists of the transmitter equipment, including the aerial system with six steel towers, each 127 m high. Even though not in regular use any more, the equipment has been maintained in operative condition.

## 2. THE PROPERTY

### *Description*

Varberg Radio Station is located 7 kilometres east of Varberg in the Parish of Grimeton, in south-western Sweden. The site comprises 109.9 hectares of land with buildings housing the Alexanderson ultra-longwave radiotelegraph transmitter constructed in 1922-1924. This includes the towers carrying the antenna installation, shortwave transmitters with their antennae, and a residential area with housing for the station staff. The main property consists of the original station site with the exception of an area containing the 'new' transmitter building and the antenna mast of Teracom AB's broadcasting station. The main buildings were designed by architect Carl Åkerblad in neoclassicist style.

Inside the transmitter building, about half the area of the transmitter hall is occupied by the Alexanderson 200-kilowatt high-frequency alternator and its associated equipment: control racks, auxiliary machinery, high-frequency transformers and the Alexanderson magnetic modulator. All are in operative condition. The other half of the hall contains shortwave transmitters installed from the late 1930s and onwards. Also these have remained in operational condition though now out of service, except for two transmitters which are still occasionally used.

Most of the site is occupied by the antenna plant. Its aerial system is supported by six steel towers, each 127 m high, arranged in a straight line 380 m from each other. The towers were designed by and constructed under the supervision of Pr. Henrik Kreüger. Each tower is associated with a radiating antenna element stretching

from the top to an inductance coil on the ground. Buried in the ground is a counterpoise network of copper wire, extending to the borders of the site and adjacent properties. A system of electricity wires on wooden poles connects the inductance coils with the buried network. An ice-melting transformer house close to the transmitter hall provides electricity to heat up and free the wires of ice in the winter. The site also comprises a large number of shortwave antennae of various designs, some still in commercial use, as well as some remains now out of use. The residential area has 12 houses for the station manager and staff.

### *History*

In the 19<sup>th</sup> century, scientific and technical developments in telecommunication were based on inventions by people like Michael Faraday, J.C. Maxwell, H. Hertz, and Guglielmo Marconi. The use of telegraph started in the second half of the century. From here, telegraphic and radio transmissions developed further in the early 20<sup>th</sup> century. The first experiments to have wireless transmission of speech across the Atlantic were in 1915 and 1919.

In Sweden, the contribution of the chief engineer Ernst Fredrik Werner Alexanderson (1878-1975) was decisive for taking these techniques further into practice. He was responsible for a number of innovations, including the high-frequency alternator for continuous (undamped) electric oscillations, which led to the improvement of telegraphic wireless communication over large distances as well as providing the basis for wireless telephony, later leading into radio broadcast. He developed the 'multiple-tuned antenna', a system of cooperating vertical antennae, which resulted in an important improvement of long-wave radio communication.

Alexanderson promoted the plan for a global radio-telegraphic network after the First World War. The Radio Corporation of America was formed to exploit and commercialise these achievements. From the end of World War I to the mid-1920s the global network of radiotelegraphic stations was constructed according to Alexanderson's system of which Varberg Radio Station at Grimeton became a part, built in 1922-24. The structural engineer Henrik Kreüger (1882-1953) was responsible for the six antenna towers at Grimeton, the tallest built structures in Sweden at that time.

By the end of the 1920s, the rapid development in electronic transmitters for long-distance wireless communication made the Alexanderson technique obsolete. Of the large Alexanderson stations only Varberg Radio Station remains today; the others were either modified or demolished. The Varberg station was used in regular service until the 1960s, but it has been kept in working condition even later.

### *Management regime*

*Legal provision:*

Formerly, the site has been owned by Telia Mobile AB and Teracom Svensk Rundradio AB with the State as sole shareholder. The residential houses have been on private

land. Now the entire site has been transferred to the ownership of the newly established Grimeton World Heritage Foundation.

The radio station was listed as cultural heritage in 1996 under the Cultural Monuments Act (SFS 1988:950). The County Administrative Board of Halland, located in Halmstad, is the supervisory authority in this respect.

According to the Environmental Code and in the context of national physical planning, the National Heritage Board has declared the radio station and its immediate surroundings of national interest for heritage conservation. The Municipality of Varberg has the responsibility to monitor the site and its protection. A comprehensive plan according to the Planning and Building Act (SFS 1987:10), adopted by the Municipality Board, includes the protection of the Grimeton area.

#### *Management structure:*

Responsibility for the maintenance and management of the property rests primarily with the owners. The County Administrative Board, in its official capacity, has the final decision on matters related to cultural significance of the site. The County Museum provides expert knowledge. The Municipality of Varberg has responsibility for facilitating the positive development of the site and its surroundings according to the Building and Planning Act.

An Executive Management Committee for the radio station have been established, consisting of representatives for Telia Mobile AB, the County Administrative Board and the Alexander Society. The property management plan of the Varberg Station for 2003-2007 has been revised by the Halland World Heritage Council in September 2003, taking into account the new ownership situation.

#### *Resources:*

Telia Mobile AB, the owner of the property, is maintains the radio station in co-operation with the County Administrative Board (2.5 million Swedish crowns/year). The works include a running maintenance programme of the antenna towers.

The Alexander Society, consisting mainly of former employees of the radio station, has an important role in keeping the knowledge of its history and teaching young people.

At the regional level, expertise is provided by the County Administrative Board and the County Museum of Halland for relevant tasks. The National Heritage Board and the Telemuseum provide expertise on conservation matters. The Board, together with the Alexander Society, Telemuseum and Telia Mobile AB, has formed a committee to study conservation methods. An international symposium in 1997 aimed at a network to discuss issues related to the conservation of old electrical equipment.

Being still in commercial use the site has been partially opened to the public only since 1996. There have since been some 4,500 visitors per year. There is a proposal to build a new building for the reception and instruction of visitors.

#### ***Justification by the State Party (summary)***

Varberg Radio Station at Grimeton was erected after World War I in the spirit of returning to peaceful conditions and restoring human communication after the war. The site, being an outstanding example of the transoceanic wireless communication sites constructed in the early 20<sup>th</sup> century, is the only surviving example of a major wireless transmitting station based on pre-electronic techniques.

*Criterion ii:* With the wireless telegraph, at the turn of the century 1900, all remaining limitations to instantaneous communication over the largest of distances disappeared; around the year 1920 in principle all places on the Earth were accessible by radio. After World War I a grandiose plan was launched to join the various parts of the world by a network of radiotelegraphic links with its hub at Radio Central, Long Island, New York, using the Alexanderson ultra-longwave technique. The Grimeton establishment was created as part of this world-encompassing radiotelegraphic system, which contributed to new patterns in the communication between countries and continents. In the 1940s, when many communication links were interrupted, Grimeton served the exchange of the free word between the Old and the New World.

*Criterion iv:* Varberg radio station displays a cross section through the entire break-through period of wireless engineering, from pre-electronic techniques to present-day communication modalities, and it has grown organically with the changing technologies. The new station building houses transmitting equipment not only for long-distance shortwave communication with other continents and with ships and aircraft all over the world but also for ultra-shortwave sound and television broadcasts and cellular mobile telephony. Most decommissioned long-distance radio communication establishments in the world have been demolished as longwave circuits were superseded by shortwave circuits and the latter were subsequently replaced by satellite links.

### **3. ICOMOS EVALUATION**

#### ***Actions by ICOMOS***

The site was visited by an ICOMOS mission in August 2003. The International Committee for the Conservation of the Industrial Heritage (TICCIH) has been consulted about the Varberg Radio Station.

#### ***Conservation***

##### *Conservation history:*

The radio station has been fully operational until the 1960s, but it has remained an industrial site until 1997, since it has been partly opened to the public. The site and the equipment have been well maintained and are in operational condition. Some equipment is still used by the Swedish Navy or for other purposes. The site is now being equipped for the reception of visitors.

##### *State of conservation:*

The state of conservation of the site is considered very good. The ICOMOS mission was also satisfied with the

large buffer zone around the site, preventing the erection of any large structures which might impinge visually on the site itself. Within the boundary of the proposed World Heritage Site there are a number of small masts, landlines and other minor structures built over the last 70 years. Some of these may be preserved but others may well be removed as operational requirements change.

#### *Management:*

The ownership has been recently changed, and the entire site has been taken over by the newly established Grimeton World Heritage Foundation. The former owner, Telia Mobile, has provided an endowment for the upkeep.

The Alexander Society has several hundred members, and they form a valuable resource for the interpretation and long-term maintenance of the site.

A considerable amount of income for the Grimeton Foundation will come from the use of the existing equipment by the Swedish Navy and other communication requirements. This income will be used, eg for the employment of a qualified radio station manager.

The revised management plan is considered fully satisfactory for the correct management of the site.

#### *Risk analysis:*

The proposed site is situated in an attractive part of Sweden with a fair amount of development pressure. However, this is mainly concentrated in the coastal region. The location of wind power stations is regulated by law and monitored by the Municipality. The land-use planning and development are well under control, and no adverse effects are foreseen for the site. There are no specified natural hazards in the region.

#### *Authenticity and integrity*

The aerials, station building, machinery and landscape of the Grimeton radio station are all original and have been well maintained. The aerials have been recently repainted, which needs to be done every 30 years. The main radio building has not been altered externally; minor alterations have taken place internally as operational requirements have changed over the years. Only one of the two original generator sets survives but that is in pristine original condition and is operational. The adjacent workers' village with its different-sized houses depending on social status has been well preserved and no significant alterations have taken place.

The surroundings of the site have also been maintained in a good condition, and the integrity of the landscape is intact.

#### *Comparative evaluation*

TICCIH, The International Committee for the Conservation of Industrial Heritage, has carried out a comparative study on radio transmitters. Following from this, the Grimeton Varberg Radio Station stands out as the best preserved and in many aspects unique heritage site.

Very few sites remain to document this early development, including some sites in Norway, America, Newfoundland

and Russia. Important is the early Marconi radio site of 1901 at the Lizard, Bass Point in Cornwall, England, and there are archaeological remains of the first antennae built by Fleming and Marconi in 1901 at Poldhu, England.

On the World Heritage List, so far, there are no other sites representing modern communication technology.

#### *Outstanding universal value*

##### *General statement:*

The Varberg Radio Station at Grimeton is an outstanding and exceptional monument representing the development of telecommunications in the early 20<sup>th</sup> century. The site is the only one remaining of this type. The original installations from the 1920s have been kept without major changes. Some new equipment has been added following the development in the field; the site thus represents a record over several decades of evolution. Even though not used anymore, except for limited purposes, the equipment has been maintained in working order.

##### *Evaluation of criteria:*

*Criterion ii:* The spread of the systems of worldwide communications from the middle of the 19<sup>th</sup> century with the development of submarine cables, has transformed the way in which people could communicate. The discovery of radio communication has greatly contributed to this development. The large numbers of Swedes who emigrated to America in the 19<sup>th</sup> century makes this site significant facilitating exemplifying how people could then be in touch across the ocean without vast expense. The Varberg radio station is an outstanding monument representing the process of development of communication technology after the First World War.

*Criterion iv:* The Varberg radio station at Grimeton is the only large radio station of the early 1920s to be preserved in the world, representing a major outcome of the early development. The site continued in use until the 1960s, and thus includes equipment documenting the further development of technology over some three decades.

## **4. ICOMOS RECOMMENDATIONS**

### *Recommendation with respect to inscription*

That the property be inscribed on the World Heritage List on the basis of *criteria ii and iv*:

*Criterion ii:* The Varberg radio station at Grimeton is an outstanding monument representing the process of development of communication technology in the period following the First World War.

*Criterion iv:* The Varberg radio station is an exceptionally well preserved example of a type of telecommunication centre, representing the technological achievements by the early 1920s, as well as documenting the further development over some three decades.

ICOMOS, March 2004