

**Engineering Heritage Branch
South Australia Division
Institution of Engineers, Australia,
11 Bagot St.,
North Adelaide, SA 5006**

The Chairman and Members,
The Plaquing Sub-committee,
Engineering Heritage Australia,
Institution of Engineers, Australia,
Engineering house,
11 National Circuit, BARTON, ACT, 2600

3rd August, 2001

Gentlemen,

SUBJECT: NEL PLAQUING NOMINATION FOR RIVER MURRAY BARRAGES

The attached documentation relating to the River Murray Barrages near Goolwa, South Australia supports the nomination for the works as a National Engineering Landmark. We understand that a successful application for NEL status requires proof of -

- 1 National significance, or,
- 2 Engineering significance, or,
- 3 A combination of national and engineering significance.

We believe that the case for such recognition is well made on two grounds, namely, -

- The listing in June, 1998 of the River Murray Barrages in the Register of the National Estate Database (Database Number: 102415; File Number: 3/09/086/0046); and,
- The attached documentation drawn up in accordance with the requirements of the IEAust guide - "The Australian Historic Engineering Plaquing Programme".

While the attached report "Nomination of River Murray Barrages as a National Engineering Landmark" presents the full case which we ask the Sub-committee to consider, the following Executive Summary is offered by way of introduction.

EXECUTIVE SUMMARY

Current Name.....	River Murray Barrages.
Current Owner....	Murray-Darling Basin Commission Gas Industry House 7 Moore Street Civic, Canberra, ACT
Local Aboriginal Community...	Ngarrindjeri
Location	Near the mouth of the River Murray in South Australia
Map Reference.....	The barrages are shown on the 1:50,000 SA Lands Dept Maps entitled "Goolwa 6626-1" and "Narrung 6726-4".

Boundary	There are five separate boundaries (for National Estate listing), each boundary corresponding to the extremities of the five barrages.
Local Government	District Council of Alexandrina (Goolwa and Mundoo Barrages). District Council of The Coorong (Boundary Creek, Ewe Island and Tauwichee Barrages)
Register of the National Estate...	The River Murray Barrages were successfully nominated for listing on the Register of the National Estate by the owner (SA Water) in June, 1998
Access to the site.....	A popular summer recreational area and information kiosk with an estimated 100,000 visitors annually, is located adjacent to the main barrage (Goolwa Barrage) which is open to the public.
Future care and maintenance....	The Barrages are integral components of the River Murray locks and weirs system operated by the Murray-Darling Basin Commission. The Barrage structures are held in trust by the State of South Australia for the Commission and are managed and operated by SA Water (formerly Engineering and Water Supply Department) on behalf of the Government of South Australia.
Name of Sponsor.....	SA Water
NEL plaque.....	An information plaque will be set on a specially-built cairn located adjacent to the southern right abutment of the Goolwa Barrage, at the eastern extremity of the picnic area. The proposed wording of the plaque is as follows:-

River Murray Barrages

Designed and constructed by the Engineering and Water Supply Department of South Australia between 1935 and 1940, and funded by the Governments of the Commonwealth of Australia and the states of New South Wales, Victoria and South Australia under the River Murray Waters Agreement. The type and scale of the River Murray barrages are unique in Australia. They maintain fresh water in Lakes Alexandrina and Albert and stabilise water levels to allow irrigation of adjacent land. River floods pass through the concrete sluice and gate sections. A lock in the Goolwa barrage permits the passage of large vessels, whilst a lock in the Ewe Island barrage caters for small boats. Without the barrages, the growth of Adelaide and the supply of water from the lower River to the lower South-East of the state would not have been feasible.

Dedicated by The Institution of Engineers, Australia,
Murray-Darling Basin Commission and
South Australian Water Corporation

2001- The Centenary of Federation

Heritage Significance.....

The Barrages have an impact on the Coorong through reduction and regulation of river flows to this area;

The association with the River Murray of the River Murray Commission (1915) and more recently the Murray-Darling Basin Commission, represent landmark legislative initiatives in Commonwealth/State relations;

the River Murray Barrages are extensive: it is considered unlikely that structures of their scale will ever be repeated in Australia;

the barrages are much valued by the community because of the vital function they perform - separating sea water from fresh water;

the adjacent Hindmarsh Island has been the object of a significant cultural/legal dispute involving land developers and the Ngarrindjeri people.

Existing plaques:

There are already existing plaques ,two located on the abutment arch (south side) by the EWS (Engineering and Water Supply Dept) and one separate plaque on a cairn dedicated by the MDBC in 1998. Please refer to the attached pictures.

Ceremony:

It is planned to conduct the plaquing ceremony on Friday 28th September in conjunction with the “Water history” seminar which is being held in Goolwa on the PS Murray Queen. Please refer to the attached document for detail on this event and an invitation.

RECOMMENDATION

We **recommend** that the Plaquing Sub-committee approves the nomination of the River Murray Barrages as a National Engineering Landmark and look for a speedy resolution of this matter so that arrangements for the plaquing ceremony, scheduled for Friday, 28 September, 2001, can proceed without delay.

Yours Sincerely,

Nigel Ridgway

Nigel Ridgway

Chair, Engineering Heritage Committee,
South Australia Division of Institution of Engineers, Australia.

NOMINATION OF
RIVER MURRAY BARRAGES
AS A
NATIONAL ENGINEERING
LANDMARK

**The
Institution
of Engineers,
Australia**

SOUTH AUSTRALIA DIVISION

August 2001

**NOMINATION OF
RIVER MURRAY BARRAGES
FOR A
NATIONAL ENGINEERING LANDMARK**

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RIVER MURRAY BARRAGES

1. NAME, OWNERSHIP AND PLAQUE TEXT

Current Name.....	River Murray Barrages.
Current Owner....	Murray-Darling Basin Commission Gas Industry House 7 Moore Street Civic, Canberra, ACT
Local Aboriginal Community...	Ngarrindjeri
Location	Near the mouth of the River Murray in South Australia.(refer attached location plan PH218-1).
Map	The barrages are shown on the 1:50,000 SA Lands Dept Maps entitled "Goolwa 6626-1" and "Narrung 6726-4".
Boundary	There are five separate boundaries (for National Estate listing), each boundary corresponding to the extremities of the five barrages.
Local Government	District Council of Alexandrina (Goolwa and Mundoo Barrages). District Council of The Coorong (Boundary Creek, Ewe Island and Tauwichee Barrages)
Register of the National Estate...	The River Murray Barrages were successfully nominated for listing on the Register of the National Estate by the owner (SA Water) in June, 1998
Access to the site.....	A popular summer recreational area and information kiosk with an estimated 100,000 visitors annually, is located adjacent to the main barrage (Goolwa Barrage) which is open to the public.

Future care and maintenance....	The Barrages are integral components of the River Murray locks and weirs system operated by the Murray-Darling Basin Commission. The Barrage structures are held in trust by the State of South Australia for the Commission and are managed and operated by SA Water (formerly Engineering and Water Supply Department) on behalf of the Government of South Australia.
Name of Sponsor.....	SA Water
NEL plaque.....	An information plaque will be set on a specially-built cairn (by SA Water) located adjacent to the right abutment of the Goolwa Barrage, at the eastern extremity of the picnic area. The proposed wording of the plaque is as follows:-

River Murray Barrages

Designed and constructed by the Engineering and Water Supply Department of South Australia between 1935 and 1940, and funded by the Governments of the Commonwealth of Australia and the states of New South Wales, Victoria and South Australia under the River Murray Waters Agreement. The type and scale of the River Murray barrages are unique in Australia. They maintain fresh water in Lakes Alexandrina and Albert and stabilise water levels to allow irrigation of adjacent land. River floods pass through the concrete sluice and gate sections. A lock in the Goolwa barrage permits the passage of large vessels, whilst a lock in the Ewe Island barrage caters for small boats. Without the barrages, the growth of Adelaide and the supply of water from the lower River to the lower South-East of the state would not have been feasible.

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2. OVERVIEW OF THE NOMINATION

2.1 NAME OF WORK AND LOCATION

The **River Murray Barrages** are located approximately 75km SSE of Adelaide near the mouth of the River Murray . There are five separate barrages. One barrage is located across the main channel just upstream of the mouth of the River Murray near the historic river town of Goolwa, the other four are located across the shallow waterways and channels that run between Lake Alexandrina and the northern end of the Coorong.

2.2 BACKGROUND, CONSTRUCTION AND OPERATION

From the earliest days of European settlement along the lower reaches of the River Murray there were strong representations from landowners for the construction of barrages, either across the river near Wellington, to keep the lower reaches of the river fresh, or near the Murray Mouth which would also keep Lakes Alexandrina and Albert fresh. These representations led to several proposals in the 1890s.

The River Murray Commission was created in 1915 to represent the interests of the three states through which the River Murray flowed and the Commonwealth in the regulation and apportionment of the waters of the River Murray. Early projects concentrated on establishing permanent navigation of the river and stabilisation of river levels for irrigation. It was not until 1931 that their attention turned to the river mouth when the lock and weir program was discontinued due to the rapid decline in river navigation.

The design and construction of the barrages was undertaken by the then Engineering and Water Supply Department using its own resources and construction equipment previously used on the locks and weirs construction. In accordance with the River Murray Waters Agreement of 1915, costs were shared equally by the Governments of Victoria, New South Wales, South Australia and the Commonwealth.

Work on the barrages commenced in 1935 and was completed in 1940. At the completion of construction the total cost was £750,000. Approximately half of the cost was absorbed by Goolwa Barrage. The Barrages were first put to the test during the 1944-45 drought when they proved that they were capable of preventing the ingress of the sea during periods of low river and maintaining the freshness of Lakes Alexandrina and Albert. It also proved that Adelaide could be supplied from the River Murray if desired.

Before the construction of the barrages, tidal effects and intrusion of sea water during periods of low river flow were felt up to 250 km upstream of the mouth. Without the barrages, supply of water to Adelaide and the Lower South-East of the state using pipelines from the lower reaches of the River would not have been feasible. In an average year the River Murray provides approximately 40% of Adelaide's water and in dry years this can go as high as 90%. Over 14,000 hectares is under irrigation between the barrages and Lock 1 at Blanchetown.

2.3 PRESENT PHYSICAL CONDITION

The Barrages at the mouth of the River Murray are integral components of the system of barrages, locks and weirs used to regulate flow in the waterway over a river distance of nearly 1700 km. The continued maintenance of the Barrages is one of the main responsibilities of the Regional Office of SA Water, on behalf of the Commission, located in Murray Bridge, SA.

2.4 HISTORICAL BIOGRAPHIES

The designs for the Barrages were prepared under the supervision of Mr J.H.O. Eaton, Engineer-in Chief of the Engineering and Water Supply Department, and his successor, Mr H.T.M. Angwin. Mr E.R. Lawrie was the Engineer for Construction and the Resident Engineer was Mr H.G. Oliver.

Mr J.H.O. Eaton, who was born at Goolwa in 1869, joined the Engineer-in-Chief's Department in 1884 and rose through the ranks to be appointed the first Engineer-in Chief of the Engineering and Water Supply Department when it was formed in 1929. (For the following 65 years the Engineering and Water Supply Department played an important role in the development of South Australia. In 1995 it was replaced by the South Australian Water Corporation.) In 1918 he was appointed a Member of the River Murray Commission.

Bibliographies on J.H.O. Eaton, H.T.M. Angwin, and E.R. Lawrie can be found in Cumming & Moxham (1986).

2.5 TECHNICAL SUMMARY (AS CONSTRUCTED)

Dam Construction....	Goolwa Barrage is constructed of concrete; each of the other barrages is an earth embankment with concrete sluices. The sluice sections comprise a footing slab supporting closely spaced piers. Between the piers either hinged radial gates or removable stoplogs are installed to control water level and trafficable deck units span between the piers to allow the passage of vehicles (for operational reasons only, the barrages are not public roadways). A lock is incorporated into the Goolwa Barrage to permit passage of large vessels and a smaller lock is located in Ewe Island for small boats.	
Purpose	The purpose of the barrages is to maintain Lakes Alexandrina and Albert as fresh water lakes and to stabilise the lake levels to allow irrigation of adjacent land. The barrages are designed to pass river floods through the concrete sluice sections without raising the lake levels but prevent the ingress of sea water.	
Height	Goolwa 5.8 m above channel bed Other Barrages 1.5 m above channel bed	
Length	Goolwa	632 m
	Mundoo	792 m
	Boundary Creek	243 m
	Ewe Island	2,271 m
	Tauwitchere	3,658 m
Lake Volume	The volume of fresh water in Lakes Alexandrina and Albert controlled by the barrages is approximately 2 million megalitres.	

2.6 MODIFICATIONS

Over the years since first constructed, changes have been made to components of the barrages but the original concrete work has remained relatively intact and in generally good condition. The main changes that have been made are:

- Mechanisation of the lock gates in Goolwa Barrage.
- Replacement of timber stop logs with precast concrete stop logs
- Replacement of the original steel radial gates with new gates of similar design
- Replacement of the original timber decking with precast concrete deck units and (where public access is permitted at Goolwa Barrage) open grid walkways and handrails.

3. STATEMENTS OF ENGINEERING HERITAGE SIGNIFICANCE

The River Murray Barrages' claim for registration as a National Engineering Landmark is primarily due to its uniqueness in Australia in terms of the type and scale of the works. The Barrages are unmatched by any other similar control structures elsewhere in Australia. Without these structures the growth of Adelaide to the metropolis of one million people that it is today would not have been possible.

CRITERION A3 *Importance in exhibiting unusual richness or diversity of landscapes or cultural features.*

The construction of the Barrages had a major impact on the biota and landscape in Lake Alexandrina due to the maintenance of a pool of fresh water and regulation of river flows in the lower reaches of the River Murray. The leaching of salt by the fresh water brought about a change in the vegetation around the shoreline (Faull, 1981). The Barrages are located at the northern end of the Coorong and they have had and will continue to have an impact on this environmentally significant and fragile area through the reduction and regulation of river flows into the Coorong

CRITERION A4 *Importance for association with landmark events, developments or stages in Australian history or in the history of a state, region or community.*

The Barrages were designed to protect the Lower Murray against salinity. In times of low flow salt water entered the River Murray at its mouth and infiltrated a considerable distance upstream. The barrages were therefore associated with development of the Lower Murray by ensuring river water in this region remained fresh and flows regulated at all times.

Apart from the benefits provided, the Barrages are associated with the early days of the then River Murray Commission (now Murray Darling Basin Commission) which comprised three states, South Australia, Victoria, NSW and the Federal Government. The establishment of the River Murray Commission is probably a landmark event in the development of the Murray-Darling Basin which is one of the largest drainage basins in the world.

The Goolwa and Mundoo Barrages abut Hindmarsh Island which is associated with perhaps the most significant indigenous heritage issue in Australia's history - the building of a road bridge to Hindmarsh Island across the River Murray at Goolwa. This issue and the ruling of the High Court in March 1998 (that the bridge could go ahead) is of considerable Constitutional import, with implications for the relationship between Federal and State laws, for the status of indigenous people, the process of reconciliation and Australia's standing in the international human rights forums.

CRITERION B2 *Importance in demonstrating a distinctive way of life, land use, function, or design no longer practiced, in danger of being lost, or of exceptional interest.*

The River Murray Barrages are the only barrages of this type and scale in Australia. The system comprises 5 barrages, Goolwa, Mundoo, Boundary Creek, Ewe Island and Tauwichee. Total length of all barrages is 7.6 km with the longest Tauwichee being 3.6 km.

It is unlikely that structures of this scale will ever be repeated in Australia.

CRITERION E1 *Importance for a community for aesthetic characteristics held in high esteem or otherwise valued by the community.*

The barrages are set in a landscape that is unique in Australia, being estuarine near the river mouth and adjacent to the Coorong. The structures being of low height, do not make a significant visual impact the landscape. Because of the important function that the barrages perform (separation of sea water from fresh water and maintenance of lake level) the barrages are highly valued by the community.

The barrages are located in a popular summer recreational area for the state and Goolwa Barrage is open to the public. An information kiosk is located at Goolwa Barrage.

CRITERION G1 *Importance as a place highly valued by a community for reasons of symbolic, cultural or social associations.*

The barrages have created a permanent pool of fresh water (Lake Alexandrina and Lake Albert) which is in an important animal habitat and water resource highly valued by the community and state.

In support of their battle on the Hindmarsh Bridge issue, the local Aboriginal people claim and have provided evidence that Kurranderk (Kurranderk is the Ngarrindjeri name for Hindmarsh Island) and the river, including where the barrages are located, has ritual and symbolic significance for women. That this is highly valued is shown by the intense and determined struggle that is being maintained on the issue.

4. REFERENCES

Cumming D.A., Moxham G., *They Built South Australia*, Published by the authors, 1986, pp 16-17, 55, 120-121.

Dare H H, *The River Murray Waters Scheme*, Journal of the Institution of Engineers, Australia, Vol 6, No. 6, June 1934.

Eaton J H O, *A short history of the River Murray Works*, River Murray Commission, 1945.

Faull J (Editor), *Alexandrina's Shore*, Milang and District Historical Society, 1981.

South Australian Government, *Souvenir of River Murray Barrages*, Government Printer, 1940. (Souvenir booklet - copy held in SA Water)

South Australian Water Corporation, *Information Bulletin No. 17 - Controlling the River Murray in South Australia*, South Australian Water Corporation, 1996.

5. ATTACHMENTS (copied by mail)

South Australian Water Corporation Information Bulletin No. 17
Controlling the River Murray in South Australia.

Drawings:

PH218-1	River Murray Barrages Location Plan.
PH218-2	Goolwa Barrage -Section Through Sluices
PH218-5	Goolwa Barrage - Section Through Navigable Pass
E35 141	Goolwa Barrage General Arrangement
PH218-3J	Mundoo Barrage Plan and Section
PH218-3K	Mundoo Barrage Longitudinal Section
E37 22	Boundary Creek - General Plan & Section
PH218-3D	Tauwitchere Barrage - Plan & Section
PH218-3F	Boundary Creek Barrage - Section Through Sluices
PH218-6	Ewe Isl. And Tauwitchere Barrages - Section through Sluices

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