Summary
This paper looks at changes in liquid radioactive waste discharges from Sellafield to the Irish Sea between 1993 and 2002. It gives an overview of:
- why discharges have changed
- how doses to local people have changed
- what the future trends are likely to be.

Discharges
Sellafield carries out reprocessing of irradiated fuel from Magnox and oxide fuel reactors in the UK and abroad. The Thermal Oxide Reprocessing Plant (THORP) began operation in 1994. The site also includes the Calder Hall nuclear power station, which operated between 1956 and 2003, and mixed oxide fuel production. A number of facilities are being decommissioned, including the Windscale Advanced Gas-cooled Reactor (WAGR). Treatment facilities include the Site Ion Exchange Plant (SIEP) and the Enhanced Activated Carbon Adsorption Plant (EAP). Discharges of liquid radioactive wastes require authorisation under UK law. The most recent major change in the Sellafield authorisation occurred in 1994.

Recent changes in Sellafield’s liquid waste discharge authorisations
- Authorisation changed in 1994
  - Decreases for total α, total β and 9 radionuclides
  - Increases for H, 54Co and 14C (for operation of THORP)
  - Increases for “C (for diversion from gaseous wastes)
  - Increases for “Ca and “Tc (for treatment of waste backlogs)
- Authorisation decreased in 2000 for “H and “Tc.

Environmental monitoring

Radiological significance
Doses were assessed by combining the results of monitoring and habits surveys with dosimetric data.

Habits of the local critical group relevant to liquid radioactive waste discharges from Sellafield are reviewed annually. The group eat local seafood and spend time on intertidal areas.

The dominant pathway throughout has been consumption of shellfish, particularly mussels. Doses from external exposure pathways have contributed more in recent years.

Most of the dose has been due to Pu-isotopes and 239Am, with 99Tc contributing more in recent years.

Future trends
Discharges from Sellafield will continue to reduce. Particular influences are:
- The 1998 OSPAR Radioactive Substances Strategy which requires discharges to be reduced by 2020 such that they result in ‘close to zero’ additional concentrations in the marine environment above historic levels
- The UK Strategy for Radioactive Discharges 2001 – 2020 which details historic levels zero’ additional concentrations in the marine environment above historic levels
- The Environment Agency’s review of Sellafield’s discharge limits.

Discharge reductions are therefore unlikely to significantly affect doses. In future, doses will depend on people’s habits and the environmental behaviour of radioactivity discharged in the past.

Continued environmental monitoring will enable the situation to be kept under review.

The IMPACT OF LIQUID RADIOACTIVE WASTE DISCHARGES FROM SELLAFIELD TO THE IRISH SEA IN RECENT YEARS
by Bryan Smith, John Hunt and Bill Compin

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