

INTEGRATED SERVICES OF REFUELING ACTIVITIES IN NPP

M. GARCÍA VALCÁRCEL

One of the widespread tendencies to reach the objectives that the nuclear power plants set up in their refueling outages is the use of an integrated service for refueling activities.

In this article, the advantages or reasons of this service are exposed, as well as the integrated service of refueling activities, inside containment, that Tecnatom, Westinghouse and Enusa have provided for the Ascó and Vandellós II NPPs, with their results and conclusions.

INTRODUCTION

Within the world nuclear field, it is a constant objective the search of the optimization of the refueling activities, that affect to their length, for the sake of the profitability and competitiveness and inside the established safety criteria of the nuclear plants. On the other hand, the objectives of the nuclear plants for the refueling outages are headed for the aspects of the quality, people security and the fulfillment of the established programs.

All that has made possible the generalization of the integrated service during the outages like one of the more appropriate way for the attainment of the proposed objectives.

ADVANTAGES

There are several reasons or advantages of an Integrated Service of Refueling Activities, which we may divide in two sections:

1. Advantages related to the own execution of the refueling activities, as consequence of the unique coordination that it is set up in the service and their integration in the plant organization, that:

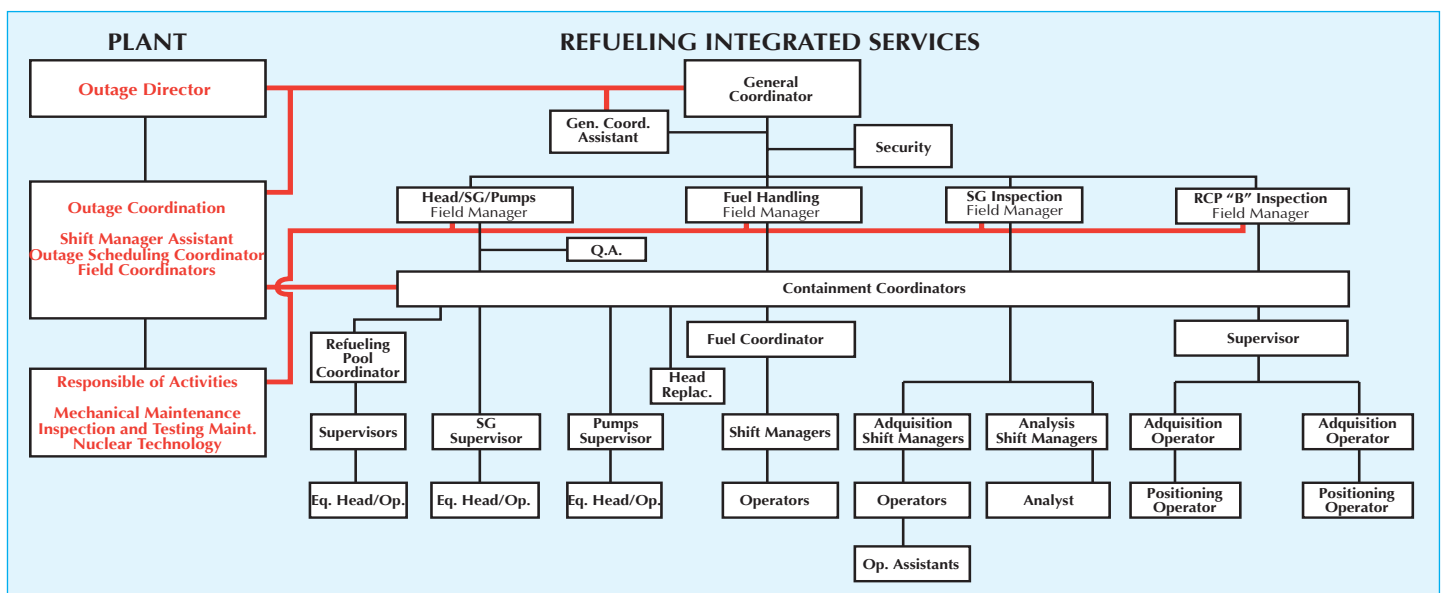
- a) It reduces the interfaces among linked activities, therefore saving time.
- b) It improves the monitoring of the activities, so much on the contractor

side as on the plant side, having an only speaker and a fluent communication.

c) It improves the prevention of labor risks, knowing each one the risks in those activities that involved is, as well as other people's.

2. Advantages in the long term, that they will act in benefit of the two parts and to consolidate them, they should take associate a commitment and guarantee of continuity on the part of the client, captured in a long term agreement, what would bear:

- a) A bigger integration among both parts when sharing expectations.



Organization.



Activities in refueling cavity.

b) A continuous improvement through the experience that would allow an optimization bigger of the processes.

c) An absolute readiness of the service, when being considered the client like high-priority.

d) A guarantee of quality of the service as for qualified personnel, advanced technology and sophisticated teams.

e) A budgetary stability, when not existing volatility of prices.

f) An insurance of continuity for the companies of services, what means to continue having qualified personnel, technology and advanced teams.

g) Possibility of integration of other services.

h) A possibility of optimization of teams, among the companies of services, consequently reducing costs.

T-W-E AGREEMENT

Tecnatom, Westinghouse and Enusa, as committed companies with the Spanish nuclear sector and therefore with their objectives, they began in the year 2002 a process of analysis of their services with the purpose of being able to offer a proposal of integrated service, including the services that each one was carrying out. That process took the form of an agreement for the fulfillment of a service, leaded by Tecnatom that integrates the activities of critical route in containment (be-

tween modes 5) and that it affects fundamentally to the following:

- Disassembly and assembly of the reactor vessel head,
- Fuel handling activities (Load and unload fuel),

- Opening, inspection for eddy currents tests and closure of the steam generators.

SERVICES PERFORMED

The services carried out so far correspond with the refueling outages of Vandellós II NPP in September 2003, of Ascó 2 NPP, in March 2004 and of Ascó 1 NPP, in September 2004.

For Vandellós II NPP, the activities included in the scope of the service were the opening / closing of the reactor vessel head, the discharge / load of fuel and the opening, inspection and closing of a steam generator.

For the refueling outage of Ascó 2 NPP, the scope was the same one enlarged with the inspection and maintenance works in the reactor coolant pumps, the maintenance of the polar crane manipulator and the coordination of the reactor vessel head replacement.

For the refueling outage of Ascó 1 NPP, in addition to the scope of unit 2, the automated inspection of the reactor vessel head was included.

To perform these activities a team was formed with the following three objectives:

- a) Unique coordination, 24 hours a day, for the activities in the containment building of the integrated service,



Steam Generator Inspection tubes.

through the containment coordinators.

b) Integration in the organization of the plant outage to assure an easy and a fluent communication. The communication with plant personnel was carried out through the corresponding daily meetings.

c) Fulfillment of the Royal Decree 171/2004, paragraph 24, Coordination of Managerial Activities, Law 31/1995 "Prevention of labor risks" that it is demanded that "when in one work center, workers from two or more companies develop their activities these must cooperate in the application of the normative on prevention of labor risks. The necessary coordination resources will be established for the workers protection and prevention of labor risks and to keep informed on them to their respective workers."

RESULTS

For an evaluation of the results the best thing is to refer to indicators that reflect the fulfillment of the proposed objectives and that they could be:

a) Duration of the service. - The achieved times have been

below the scheduled times in outage program.

b) Collective exposure. - In the three outages the collective exposure has been reduced, saving in any case until 19% of the initially foreseen doses.

c) Prevention of risks. Any accidents have taken place.

As a conclusion of the exposed above, it is reaffirmed this type of services like a tool for achieving the objectives of the nuclear plants during refueling outages, provided that there is a continuity based on the experience to continue advancing in the optimization of the processes, which would concentrate on:

a) Organization, as improvement of the coordination and communication.

b) Improvement of teams and tools, for a better quality of the service.

c) Integration of other activities, as optimization of times.

d) Possible changes in performance procedures.

e) Operative experiences in outages, as prevention of incidences and in support of the quality of the service.



Reactor vessel closure Studs Tensioner.



Reactor vessel head replacement maneuver.



Manuel GARCÍA VALCÁRCEL is Electromechanical Engineer with a degree from the ICAI. He began his professional career in 1981 in Bureau Veritas, s.l. (1981-1985) in the Quality Department of Ascó NPP. In 1985, he joined Tecnatom, s.a. where he was head of the Inspection Services in the Almaraz NPP site. In 1998, he was named Commercial Manager for the Services of Tecnatom in Spanish Nuclear Power Plants. Nowadays, he serves as Commercial Manager and Head of the Programs and Inspection Management, within the Engineering Inspection Division.