

# **HUMAN FACTORS, SAFETY CULTURE, IMPLEMENTATION IN RADIATION PROTECTION MANAGEMENT AND RADIATION PROTECTION TRAINING**

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## **1. Introduction**

Human Factors and Safety Culture are wide concepts that they have an important influence about the radiological protection. These terms are not very new in the nuclear industry but their global use and their integration in all activities is new. It is obvious that we have to care these two terms because humans have an important role in the operation of nuclear plants and in the radiological protection.

## **2. Approach to Human Factors and Safety Culture in the radiation protection.**

CN Almaraz has development a document, DGE-10, with the main areas that we are working in our plant about Organisation and Human Factor areas. This program is a recompilation of the WANO performance objectives and criteria (PO&C).

These areas are:

1. Organizational Effectiveness
2. Safety Culture
3. Human Performance
4. Self assessment and knowledge management
5. Housekeeping and configuration control
6. Work management
7. Equipment reliability
8. Industrial Safety.

As we can see the Organization and Human Factor programme have got an important impact in all plant activities and about the radiation protection too.

The main specific activities over radiological protection are:

- To implant a method to do pre job briefing in which we care radiological aspect. Procedure GE- 47.
- To implant a system for manager in the field in which they have to consider and evaluate radiological aspect. GE-31.03.

There are other activities that they helping us to improve the radiological aspect as to reinforce the ALARA meetings in work management, to improve the plant housekeeping, etc.

Pre job briefing (PJB) is an important tool to prevent incident and to study previously radiological aspects or from other kind that can affect the work execution and their radiological impact. Also is important in each activity to do a debriefing to analyze the work results and

other aspects than they can help us to improve future similar work executions and too, for example, to reduce future dose.

At CN Almaraz we have two kinds of pre job briefing, formal and informal. To do a PJB is a mandatory action before starting any activity and it is part of the main activity. Formal PJB is when the activity is related with safety activities or the activity is very complicated or unusual, also when the programmed activity can have an important radiological impact. In the rest of the case we have to do informal PJB, following the five steps WANO rule:

- Knowledge and experience.
- Critical steps
- Risk situations
- Worst case scenery.
- Precaution and protection measures.

**PROCEDIMIENTO "GE-47"**

**Reuniones Preparatorias de Trabajos**

## Regla de los 5 pasos

*Utilízala*

**Repasar:**

- 1 Conocimientos y Experiencias**  
Permisos, órdenes de trabajo, personal asignado y cualquier otra información necesaria
- 2 Pasos críticos**  
Revisar aquellos detalles o pasos importantes para la correcta ejecución del trabajo
- 3 Situaciones con riesgo de errores**  
Analizar las condiciones que pueden aumentar el riesgo de cometer errores (Precursores de error)
- 4 Escenarios del "peor caso"**  
Identificar cualquier circunstancia que pudiera causar alguna lesión, daño en la instalación o equipos, retrasos o cualquier riesgo para la Seguridad Nuclear
- 5 Medidas de precaución y protección**  
Analizar y comprobar las medidas de protección o técnicas que se planean utilizar para evitar cualquier equivocación o error

Both, formal and informal PJB are very similar and they share the same philosophy, the unique difference is for doing formal PJB we are using a paper with the main question that we need to review.

The other activity, managers in the field, we are sure that for having good result we need a visible leadership in the field from our managers. To improve and to care radiological aspects we need that our manager lives the same circumstances and environments that the rest of the workers. Also, to be sure workers are following the correct radiological practices is important that manager observe these work practices in the field and help to the workers to improve doing coaching.

To help them to do these kinds of observations in the field we have developed a special card to use it in the field. The card has several questions and aspects to be reviewed in each observation. Also, these cards have dedicated questions to radiological aspects.

Finally, the Safety Culture is a broad concept that has an influence over all activities in the plant. Safety Culture definition like the IAEA INSAG 4 document is:

“Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.”

CN Almaraz have implemented a programme in Safety Culture with periodical evaluations, external and internal, to be sure that all important activities have the necessary resource to can be executed.

An important Safety Culture activity is to be sure that all radiological aspect are well controlled and everybody have the correct training to can care, prevent, and evaluate these aspects.

Without an adequate radiological politics is impossible to define a correct Safety Culture.