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How to Tackle the Specifics of Large, Complex Decommissioning Projects

Decommissioning projects are a specific type of Large Complex Projects that require adapted approaches for success. Usual project delivery approaches are sometimes not sufficient due to certain specificities. This White Paper describes general issues associated with decommissioning projects and how to overcome them. Further White Papers will tackle specific issues related to decommissioning projects in certain industries.

Specifics of decommissioning projects

Decommissioning projects consist of the decommissioning, dismantling, remediation and removal of facility material and associated waste so as to deliver a site that is suitable for its intended reuse.

Although only a minor subset of construction projects, decommissioning projects are often very visible to the public and present distinct challenges that sometimes induce very high costs overruns or substantial delays. Specifically, there is often a wide disconnect between the official intent and the actual schedule of decommissioning, which may be much longer.

Traps of decommissioning projects at definition stage

Stakeholder involvement

Stakeholder involvement is often of very high intensity in large decommissioning projects. This includes in particular:

- Employees of the facility (that may fear to lose their jobs) and their families,
- Local officials, concerned about the re-use of the site,
- Neighbours, concerned about health and other possible impacts of the project, for example related to the logistics of transportation,
- Environment protection groups

Those concerns and requirements must be considered in the project definition stage, often much further than the mandatory regulated input of requirements (e.g. through public enquiry). The social and employment component are particularly often a major derailment factor for major decommissioning projects. The outlook of a positive site reuse or of the development of new economic activities in the vicinity is often a decisive success factor.

Definition of the final condition of the facility area

The ideal of complete decommissioning and remediation ('back to the green pasture' or unconditional release) is generally not operational for industrial facilities. It is also not necessarily the actual need in particular if the site remains for industrial usage.

The final condition of the site is a major success factor that must be carefully calibrated at project definition stage. It will depend on the intentions for its future use and sometimes optimization must be carried out to make cost and schedule acceptable through compromises. Regulatory aspects have also to be considered (restrictions on the future usage of the site to be included in local urbanization records). Not only the final state should be defined, but also the measuring, sampling and demonstration protocol to avoid any later misunderstanding. In any case, inappropriate final state definition is a major failure factor for decommissioning projects.

Applicable regulatory framework for the prevention of major accidents

For regulated industries, because hazardous material may still be present until the end of decommissioning (although generally in

much lesser quantities), the site will remain regulated. However existing industrial safety regulations are often not quite applicable to the decommissioning state as they are mostly driven

Decommissioning projects are tricky projects that would benefit from greater reliability.

toward operating facilities. The structural changes to the facility as decommissioning progresses will change substantially and quite often the facility configuration and therefore, its accident prevention demonstration (safety case). It is essential to put in place at the project definition stage a workable regulatory framework that is adapted and flexible enough to cover all phases of decommissioning. The project plan should aim to achieve a large decrease in hazardous material as soon as possible. This decrease in source term should then be leveraged to obtain flexibility in the operating restrictions of the facility. The important point in that respect is to ensure that there won't be any suspension of the decommissioning works due to a necessary regulatory authorisation for which timing is always difficult to anticipate.

A flexible regulatory framework is also a must in particular to accommodate unexpected discoveries during the course of the work. The ability to internally review and authorize work within a certain risk limit is a recommended solution to accelerate this process. The regulator can audit the way the system works, but the risk review is carried out in a time consistent with the needs of the work.

Availability of waste management streams

A facility in decommissioning stage is essentially a waste production facility. Waste management streams of sufficient throughput must be available for all categories of waste that have to be removed. In particular, any special requirements for waste pre-conditioning, pre-treatment, handling and transportation must be known and defined.

Having certain waste categories without management stream is a major hurdle to decommissioning projects and can eventually hinder them from proceeding. This is an issue for example in the nuclear industry. In general, it is not prudent to start a decommissioning project without a solution for a specific waste stream.

Avoid building new facilities for decommissioning

Decommissioning plans sometimes include the construction of new facilities for certain operations such as waste treatment or other operations strictly related to decommissioning. This is generally a bad idea, as it will add the complexities of construction and commissioning of a new facility in an obsolete

site. It is much more prudent to treat waste off-site, to set up temporary facilities with minimal investment or to re-use existing space with minimum new investment. Most decommissioning projects that include the construction of a new facility show substantial cost overruns and delays.

Financing issues

Although in most developed countries, legal frameworks are generally in place to oblige operators of polluting industries to fund a decommissioning fund, financing might not always be readily available, or may be restricted in amount and timing, or may be insufficient. Sites may also sometimes be partially orphan sites requiring public funding. Funding constraints must be taken seriously at the project definition stage as they might limit the amount of activity possible for a certain time period. The process for the timely appropriation of funds is also essential.

Occupational safety

Occupational safety is a major concern during decommissioning because workers must access previously inaccessible areas, therefore taking the risk of being exposed to unknown hazardous conditions. Major structural work is also being performed that may lead to the risk of structural instabilities. Coordination of multiple subcontractors on the site is also required. Sufficient resources must be allocated to tackle occupational safety during decommissioning works and it is generally better not to be too ambitious in terms of simultaneous operations on site.

Traps of decommissioning projects at execution stage

Unexpected conditions and the need for flexibility

A constant event in decommissioning projects is the discovery of unexpected conditions. Even with state-of-the-art facilities records, such events happen. It is like raising a carpet at home: old dust will be found irrespective of the care with which housekeeping has happened.

The project execution plan must be able to accommodate those situations without interrupting the work: frequent demobilisation and remobilisation of crews is a major failure contributor for such projects. A good management technique is to always have

several available work fronts ready for intervention where the teams can be deployed while the situation is evaluated where the unexpected situation happened. This is another reason why the site should not be overcrowded in terms of initial planning.

Additional resources must be available to assess those unexpected situations and engineer adapted intervention modes.

They may also be required to develop and file the necessary regulatory justifications.

In general, unexpected situations have to be anticipated as much as possible with relevant

buffers in the project plan and in the available project resources.

Decommissioning projects must be carefully defined, with a particular focus on the end-state, stakeholder management, regulatory permitting and waste streams.

Traps of decommissioning projects at close-out stage

Issues regarding the acceptance of the final state

At project close-out, acceptance of the final state of the site can be a major hurdle. It is essential to demobilize most of the project team during those discussions with the site owner and the regulatory bodies. The benefit of a very clear measurement protocol established at the start of the project become obvious in this stage, as well as a realistic target end state.

Sometimes it is not possible or economical to comply fully with the target end-state. Delays will be incurred as a result of additional regulatory authorisation processes. During that time keeping the team minimal is a must to minimize extra costs.

Conclusion

Decommissioning projects are generally tricky projects which would benefit from greater reliability. Successful decommissioning projects require substantial project definition work, and at the same time, a sufficiently flexible project execution framework to accommodate unexpected situations. Some key success factors are required, such as available waste streams, a realistic target end-state, a flexible enough regulatory framework, suitable financing and proper attention to occupational safety and the required flexibility to accommodate unexpected situations.



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