Leadership in Safety and Regulatory Oversight: Defining the Leadership Framework in Pakistan Nuclear Regulatory Authority

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Abstract: The purpose of this paper is to define a leadership competency framework for nuclear within Pakistan Nuclear Regulatory Authority (PNRA). It provides arguments for a more holistic approach towards leadership development in nuclear organization. It further provides leadership framework that can be used (adapted/adopted) by other regulatory bodies for developing leadership within the organization. It is expected that new countries embarking on nuclear power programme will especially find this interesting and useful as they will also face similar challenges as faced by Pakistan Nuclear Regulatory Authority during its formative year. Paper further provides insights into the process of leadership development in organization. It is suggested that an integrated approach is important to develop nuclear leadership within the organization. It was also found that an effective leadership development program is not only long process but requires commitment from top leadership. Leadership gap analysis, providing open feedback and action learning project were important elements for leadership development.

Key words: PNRA, NRC, leadership.

1. Introduction

Pakistan Nuclear Regulatory Authority was established in 2001 under an Ordinance called the PNRA Ordinance. The Ordinance allows PNRA to provide regulatory oversight over a large spectrum of nuclear facilities and activities. The total staff at that time was 38 which were not sufficient to cover the whole spectrum of activities and facilities. PNRA therefore started a rigorous recruitment campaign and within a span of next 7 years its technical staff rose to 240, an eight fold increase. The average age drastically dropped from 55 years to 35 years, however, this poses a number of challenges including problem of assimilation and competency building in all areas of regulatory oversight. PNRA therefore started a rigorous education and training program [1] based on the competency model as given in TECDOC-1254 “Training the Staff of the Regulatory Body for Nuclear Installations: A Competency Framework” [2]. This is a unique competency model well suited for nuclear regulatory staff, it has elements of legal, technical, regulatory practices and personal & interpersonal skill. Although it talks about development of leadership as essential for a good regulator but it does not defines the competency of leadership for an effective regulator.

To quote from Malcolm Craft seminal book [3] “Regulatory Craft”, “Regulators, under unprecedented pressure, face a range of demands, often contradictory in nature: be less intrusive – but more effective; be kinder and gentler – but don’t let the bastards get away with anything: focus your efforts –but be consistent; process things quicker- and be more careful next time; deal with important issues-but do not stray outside your
Leadership in Safety and Regulatory Oversight: Defining the Leadership Framework in Pakistan Nuclear Regulatory Authority

statutory authority; be more responsive to the regulated community—but do not get captured by the industry”. Such is the nature of regulators job and they are required to navigate a difficult path and take decision between two extreme positions at times. No doubt that SF-1 has made “leadership in safety” the third guiding principle. Bardach and Kagan in their book [4] “The Problem of Regulatory Unreasonableness: Going by the Book” have described characteristics of “The Good Inspector”. According to them in the words of an enforcement official, “the good inspector should have the capacity to empathize with those subject to the law and to understand their concerns, problems, and motivations”. “Knowledge is important”, said a truck safety inspector, “but ability to get along with people is just as important”.

In our opinion Leadership is crucial and perhaps Chernobyl, Three Mile Island, TEPCO, Toikamura, David Besse, Mihama and Vandelllos to name the few accident and incident may not have happened had there been more emphasis on developing of leadership competency in regulatory staff. A regulator has a unique challenge to thread between a number of legal and technical issues and yet have to come to a decision which may not be the best, but should be the safest option for public safety. Bardach and Kagan had very clearly elaborated that “had there been no grey area then probably we would not need a regulator”. Recent examples of Canada in which Chief Regulator has to take decision on shutting down a plant which was not supported by the parliament as they perceived this not to be the correct balance between safety and production, although just on technical grounds the decision seems to be appropriate, shows the challenges that a regulator faces in present times.

Literature survey of nuclear regulators has shown the little work on the development of leadership competencies exist or have been published by the nuclear regulatory bodies. The evidence the authors were able to found in literature was from U.S. Nuclear Regulatory Commission (NRC). NRC program resembles closely to PNRA as shown in Table 1. The need for leadership development is not limited to the nuclear regulators; operators also need to develop a comprehensive leadership development program. However the authors were unable to found any published literature. One example that the authors found is of Bruce Power (Canada’s first private nuclear generating company), which gives confidence to their staff by career path where they can grow professionally (sources…). They created a leadership model (Gordon Orlikow, 2008) [5], which enables new performance management, leadership development, succession planning and recruiting processes.

PNRA in 2006 also conducted a comprehensive self assessment of its regulatory activities based on a model presented in IAEA Draft TECDOC. The result of self assessment indicated “Leadership Development” as one of the weak areas in PNRA [2]. Therefore in 2007, PNRA along with a leading business school in Pakistan which is more involved in development of leadership in the business world started a structured programme of leadership development. The first thing was to develop a framework, after thorough deliberation it was concluded that the competitiveness, compassion, credibility, consistency and passion are essential trait of a leader in nuclear safety and regulatory oversight in Pakistan. This framework comprising of 4Cs and 1P is given in Table 2. Section 2 describes in detail the framework and how this was selected.

2. The Leadership Model

In PNRA Leadership was defined in terms of setting a direction, energizing the people, and aligning individual and group goals to the organization goals and values. PNRA leadership framework is based on 4C and 1P core elements of leadership in regulatory bodies. The basis and rationale for selection of this framework was to capture leadership from both transformational and transactional dimensions [6]. For example, to capture transactional side of the leadership, they included competitiveness, consistency and credibility.
Leadership in Safety and Regulatory Oversight: Defining the Leadership Framework in Pakistan Nuclear Regulatory Authority

Table 1  Comparison between the NRC and PNRA.

<table>
<thead>
<tr>
<th>NRC Program Element</th>
<th>PNRA Program Element</th>
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<tr>
<td>Individual Needs Assessment - Each participant complete an individual needs assessment designed to determine those competencies which will be developed or reinforced during the program.</td>
<td>360 Degree Feedback - It provides areas of improvement for each individual of leadership development program. It highlights perceptions of others on leader competencies and behaviors. The challenge for individual leaders is to reconcile the gap between self-perception and others’ perceptions to enhance their leadership.</td>
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<td>Orientation - Each participant is provided with program requirements, policies, and expectations. Participants will meet with top agency management to discuss NRC policy and issues, and expectations for the program.</td>
<td>Meetings with higher Management- Approximately on quarterly basis, meeting is held with PNRA management to discuss the progress of the LDP and to communicate the expectations of the program.</td>
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<td>Senior Advisors - Through their experience, proven capabilities, and management perspective, SES Senior Advisors assist participants in further clarifying their developmental objectives and in identifying developmental assignments and activities.</td>
<td>Supervisors- For the selected candidates of LDP, four supervisors are assigned to share experience, monitor and mentor the young leaders. These supervisors provide feedback to the candidates to improve their leadership skills.</td>
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<td>Individual Development Plans - An Individual Development Plan (IDP) is prepared by each participant, together with the immediate supervisor and the Senior Advisor. The IDP is used to document the dates each participant starts and finishes the program, is approved by the NRC Executive Resources Board, and is updated or revised as needed throughout the program.</td>
<td>Action Learning Project- Based on 360 degree feedback, individuals come-up with action learning project for the approval of the board members (supervisors and representative from higher management).</td>
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<td>Interagency Training - The program requires a formal interagency training experience of at least 80 hours that addresses the executive core qualifications and their application to SES positions Government wide.</td>
<td>Training- The program includes formal training to LDP candidate. Extensive and exclusive courses are designed with the leading business school in Pakistan.</td>
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<tr>
<td>Performance Evaluation - Performance in the program is evaluated periodically to assure timely completion of program activities and individual developmental activities as specified in the IDP, based on feedback from Senior Advisors, supervisors, rotational assignment supervisors, and the Program Manager.</td>
<td>Evaluation - Performance in the program is evaluated periodically by the board comprised of all supervisors and program manager (representative of higher Management) to assure timely completion of action learning project and evaluation of individual gaps filled as an outcome of execution of action learning project.</td>
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Table 2  PNRA leadership development framework.

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<tr>
<th>PNRA Leadership Framework</th>
<th>Competitiveness</th>
<th>Compassion</th>
<th>Credibility</th>
<th>Consistency</th>
<th>Passion</th>
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<tr>
<td></td>
<td>Create an inspiring version of the future, make tough strategic decisions, act with regulatory foresight</td>
<td>To be caring, willing to motivate and capacity for counseling, coaching and mentoring</td>
<td>Be reliable, professional and authentic while dealing with licensee and stakeholders</td>
<td>Consistent in decision making achieving targets and be energetic for achieving objectives</td>
<td>Having heartfelt, deep and authentic excitement about our stakeholders, the profession and PNRA</td>
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and to cover the transformational side of the Leadership, they included compassion and passion. The authors have further tried to define the basis and rationale for each of the element with the regulatory functions. The first element of the framework “Competitiveness” was also selected on the basis that PNRA was facing a human resource challenge and it has gone through an ambitious recruitment drive which resulted in an eight fold increase in the technical strength and from being an organization of grey haired it suddenly found itself to be an organization of baby boomers, however, it was noticed that public sector organizations such as PNRA were not being able to attract high class graduates from top universities. Most of the high caliber graduates were moving abroad for pursuing higher studies, the next tier of graduates were recruited by multinationals and large oil sector national corporation and so PNRA had to rely on this tier which although had very sound scientific and engineering background lack the competiveness drive that make a good leader. In fact it was found that competitiveness was considered an ungentlemanly attribute and having especially expressing an ambition a negative trait. This was creating a culture of submissiveness and
unquestioning attitude which as a whole in not in line with the characteristics of good safety culture as defined in INSAG-4 “Safety Culture” [7]. This report by the International Nuclear Safety Advisory Group defines safety culture as “Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receives the attention warranted by their significance”. The authors thought that PNRA should make a deliberate attempt to introduce “competitiveness” which will promote ambition and dynamism in the organization and so the first element of the model was selected as “Competitiveness”. However, our understanding of the national culture and organizational norm of PNRA cautioned us that unbridle competitiveness may lead to cut throat competition and may be detrimental for a young organization like PNRA where 200 of newly recruited staff of an average age of 28 may be competing in every area of work making the regulatory decision making quite chaotic. So to dampen the effect “Compassion” was used as the second element of the framework. It was also meant to create a culture of grooming, nurturing and coaching. The next two element “Credibility” and Consistency” is taken from IAEA Safety Series No 11 “Developing Safety Culture in Nuclear Activities: Practical Suggestion to Assist Progress” [8], which defines that in order to achieve the third level of safety culture, which is the highest and organizations start thinking of continuous improvement, a regulator need to develop credibility with its stakeholder so it was considered that “Credibility” should be an element of the framework. Similarly, the same report also refers to “Consistency” in decision making to be important for an effective regulator. The selection of the fifth element of the framework was the most difficult, but most obvious. During recruitment, it was also felt that though PNRA was attracting fairly high number of graduates, however, not many graduates have much understanding of regulatory work and more so any passion for it. Since, regulator by nature of its work neither manufacture a nuclear power plant nor operate it which was considered far more challenging and passionate by young graduates. The authors felt that the lack of passion in regulatory work would hinder not only the success of this young organization but would also be detrimental for the success of so many young people in our organization and so “passion” was introduce as the final element of this framework. Furthermore, a set of competency was selected to be associated with each of the five core elements of the framework. Following is the list of core elements and associated set of competency for each of the element. In total there are 18 leadership competencies.

2.1 Competitiveness

The ability to create an inspiring vision of the future, make tough strategic decisions, act with regulatory foresight. Following are the four competencies areas under competitiveness:

(a) Analytical and Judgment;
(b) Technical Acumen;
(c) Control Aggressiveness;
(d) Outstanding Mind.

2.2 Compassion

Be caring, willing to motivate, and capacity for counseling, coaching and mentoring. Following three competencies areas are under compassion:

(a) Motivating;
(b) Caring and Sensitive;
(c) Counseling.

2.3 Credibility

Be reliable, professional and authentic while dealing with licensee and stakeholders. Following four are the competencies areas under credibility.

(a) Managing Self and Organization;
(b) Managing Team and Organization;
(c) Self Confidence;
Leadership in Safety and Regulatory Oversight: Defining the Leadership Framework in Pakistan Nuclear Regulatory Authority

2.4 Consistency

Be consistent in decision making achieving targets and be energetic for achieving objectives. Following four competencies areas are under consistency:

(a) Politeness;
(b) Cultural Fluency;
(c) Personal Energy;
(d) Communication and Networking.

2.5 Passion

Having a heartfelt, deep and authentic excitement about PNRA mission, its purpose, PNRA stake holders, and the regulatory profession. Following three competencies areas are under passion.

(a) Optimistic/Positive Attitude
(b) Will to Lead
(c) Courage

These four Cs and one P definition of leadership was later expanded into a 48-question for 360-degree feedback instrument. In section 3 and 4, the authors would explain some of the mechanism that was used for building the leadership competency in PNRA based on the Leadership Development Framework.

3. 360-Degrees Feedback

A group of twenty officers were selected to start this program. The selection was done on the basis of their past performance and some leadership attributes. All officers were required to go through a 360-degree feedback. 360-degree feedback is a valuable leadership development strategy for organization but it needs to be seen in a larger talent management system within the organization [9]. 360-degree feedback provides perceptions of others on leader competencies and behaviors. The challenge for individual leaders is to reconcile the gap between self-perception and others’ perceptions to enhance their leadership [10]. Church and Bracken [11] further identified that 360-degree feedback process is based on the “simple assumption, that observations obtained from multiple sources will yield more valid and reliable results for the individual”. Multiple sources are better than one when it comes to observing behavior, and that really is what 360-degree feedback provides. In PNRA perceptual feedback was provided to individual manager on 18 different leadership competencies. In general the results varied with some officers having a more pronounced negative perceptual gap while some having a more pronounced positive perceptual gap. There were not many who showed “insignificant perceptual gap” which is considered to be an effective leader [12]. It was also noted that people with high positive perceptual gap showed tendency of over rating themselves while those showing high negative perceptual gap have tendency of under rating themselves.

3.1 Perceptual Gaps

Perceptual gap is the differences between the leader and ratter perspective on the level of behavioral competencies demonstrated by the leader at work. Manager’s supervisor, seniors, subordinates, and peers (Ratters) observe the leader’s level of competencies, when leader demonstrates competencies through performing different tasks and activities. The perceptions are formed on the occurrence of behaviors. On the basis of these observations ratters create a perception regarding individual manager’s (level of) leadership competencies and style. It is reported in the research [13] that managers with insignificant perceptual gaps with the ratters were more effective and successful leaders within the organization. Leader subordinates were motivated and supervisors were more satisfied with their performance as a leader. Manager with high perceptual gaps with the ratters especially with the subordinates and supervisors were less effective as leaders. Managers with the high perceptual gaps were making wrong assumptions, misjudging others expectations and behaviors, and ultimately were less effective as leaders. In the following three different types of perceptual gaps are presented.
(1) Positive Perceptual Gap (PPG): If the leader’s score is higher than his or her raters’ average score, it is considered Positive Perceptual Gap. Furthermore, if this gap is equal to 0.5 or above, then it is considered a High Positive Perceptual Gap.

(2) Negative Perceptual Gap (NPG): If the leader’s score is lower than his or her raters’ average score, it is considered Negative Perceptual Gap. Furthermore, if this gap is equal to -0.5 or above, it is considered a high Negative Perceptual Gap (Fig. 1).

(3) Insignificant Perceptual Gap (IPG): If the leader’s score is equal to the average score of his raters or the difference between the two scores is less than +/- 0.5 then it is considered an insignificant Perception Gap (IPG).

Each individual manager in PNRA selected two subordinates, two peers and his or her boss or senior manager who has seen him or her working within the organization. Leaders and Ratters were provided a separate 48 item questionnaire for 360-degree feedback to measure 18 leadership competencies. A detail leadership perceptual gap report was provided including competencies gaps to each of the participants of the leadership development program.

4. Action Learning Project

In order to enhance their leadership competencies and reduce the positive or negative perceptual gap, every participant of the leadership development program was required to select an “action learning project”. Action learning project provides strategic or operational, short or long, within or outside the organization “stretch” assignments to individuals with the focus on the targeted competencies. These assignments could also be variety of experiences, through cross-functional projects or job rotations, new and unfamiliar situations, high responsibilities and high latitude jobs. Action learning emphasizes personal responsibility for learning, although with organizational support system [13]. Organizations also some time encourage negative experiences or hardship to promote learning and trigger self-reflection through action learning. In PNRA, action learning consists of individual leaders working in their own functional areas. As a result of the action learning project, a leadership development portal (Fig. 2) was also established, group or units with selected team members on a real developmental project (see list of action learning projects in Table 3). These action learning project were a great help as these young leaders took initiative and acted as a team leader within these action learning projects and provided directions, achieve project objectives, solve problems which not only were beneficial for PNRA but also help in developing his or her individual leadership competencies. He or she also transforms other team member’s perception about his or her leadership competencies (perceptual gaps that were identified from the 360 degree feedback).

The objectives for individual leader were to reduce the positive and/or negative perceptual gaps into insignificant perceptual gaps, as presented in Fig. 1. It requires individuals to resolve significant organizational and group related problems and at the same time changing other’s perceptions and developing themselves as competent leaders. Through action learning project it is meant that they can learn and the company gets the job done, a win/win situation for both individuals and organization. It was decided in PNRA that leaders will keep few potential managers within the action learning project team for development purpose while they themselves are developing and implementing the real project so as to create an environment of coaching and nurturing which is so essential for a leader.

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<thead>
<tr>
<th>Gaps</th>
<th>High Gap</th>
<th>Insignificant</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.5 or above (PPG)</td>
<td>High Gap</td>
<td></td>
</tr>
<tr>
<td>-0.5 or above (NPG)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than +0.5</td>
<td></td>
<td>Insignificant</td>
</tr>
<tr>
<td>Less than -0.5</td>
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Fig. 1 Perceptual gaps matrix.
Leadership in Safety and Regulatory Oversight: Defining the Leadership Framework in Pakistan Nuclear Regulatory Authority

Fig. 2 Leadership development portal.

Table 3 A list of selected action learning projects implemented by individual leaders at PNRA.

| 1 | Assessment of security levels of licensed facilities using radioactive sources in category 1-3 |
| 2 | To develop a document for the review of digital reactor trip and engineered safety features actuation system |
| 3 | Radiation safety awareness among the industrial radiation workers |
| 4 | Establishment of sustainable system in nuclear security |
| 5 | Establishment of VSAT link between the corporate office and RNSD II Kundian for data and voice traffic |
| 6 | Development of inspection checklist for evaluation of EPP infrastructure at NPPs |
| 7 | Knowledge management of the leadership development program of PNRA being conducted in collaboration with LUMS |

5. Conclusions and Recommendations

One and a half year has passed, the programme so far has been successful, the participants seem to have learned from this project and share their learning through “Leadership Portal” that they have designed and implemented in PNRA. This portal now is the backbone of mutual learning and sharing (See Fig. 2). It is also found that the framework of 4C and 1P developed for PNRA is most applicable and relevant for not only our situation but can be replicated and used for developing leadership in other regulatory bodies especially of countries which are planning for embarking on nuclear power programme. The programme has helped PNRA in identifying and grooming high caliber staff through intensive mentoring and providing opportunities to excel. Recent evaluation shows that 10 of the initial 20 selected officers have taken position of responsibility in the review team of safety analysis report which is a complex task. A few have also taken lead role in licensing of nuclear installations and radiation facilities. One officer got an accelerated promotion and moved
rapidly to the next grade and another one became the Head of the unit.

Following are the conclusions from leadership development initiative at PNRA.

1. Leadership in safety and regulatory oversight is essential. However, there are not many models for development of leadership competency in regulatory bodies.

2. Development of Leadership framework is essential for building leadership competency.

3. Leadership development framework should be based on the essential traits of leader that are required to lead a regulatory body taking into account the national norms and international aspirations.

4. PNRA leadership development framework consisting of 4Cs and 1P seems to suit well for a nuclear regulatory body and can be adapted and adopted by other regulatory bodies especially for countries embarking on nuclear power programme for competency building of their regulators.

5. In order to make the Leadership development programme successful, this should be integrated with the overall human resource development programme of the organization with clear set of evaluation criteria, performance appraisal, reward and incentives and constant monitoring and mentoring.

References


