

Sustainability Issues. Russian Aspects.

Galya Balatsky

gbalatsky@lanl.gov

Safeguards Science and Technology

Los Alamos National Laboratory

Los Alamos New Mexico 87501

16 June 1999

There are numerous cases of the MPC&A equipment and systems that were delivered and installed at the Russian facilities but were never actually put in operation or were not properly operated. This paper tries to address the problems of introducing new technologies and equipment and the issues of their future use at the Russian facilities. The underlining philosophy is that sustainability is based on three pillars: people, technology/equipment, and procedures that function in a supportive environment. Based on this approach, the paper describes a model that can be used to characterize a Russian facility in order to localize the problem areas. In addition, it contains some suggestions on what improvements of the MPC&A program can be made by considering the overall Russian environment instead of focusing on narrow specific technical issues of individual MPC&A elements (such as, NDA systems, portal monitors, etc.).

One of the main reasons that some of the equipment is not fully operated at the Russian facilities (in spite all the US efforts to provide training and support for installation, trial operation, testing and certification) is that the full implementation of the program required not only upgrading of the existing systems but a tremendous shift in the ways business is conducted in Russia.

1. For an effective Materials Protection, Control, and Accountability (MPC&A) program to be installed and be operable, all the elements: people, technology/equipment, procedures and supportive environment should be at the same level of development. The US MPC&A program has concentrated on only one of the components—technology/equipment—under the assumption that the Russians needed some help to upgrade their existing systems. The issues and problems of people and procedures have not been explicitly addressed. In addition, at many sites it is still necessary to establish a supportive environment. The Russian people have to change their mentality, business practices, and culture. Furthermore, the economic problems in Russia only exacerbate the problems with the MPC&A program.

2. Under the MPC&A program, the US side is dealing with a stronghold of the last regime—the most conservative elements within Russian society. It is necessary to establish a coalition with various Russian organizations that could help promote the general safeguards goals and policy. This coalition would also help supervise the policy and could ensure that the policy would continue to be upheld in the future.

3. The Russian MPC&A design is rooted in the Soviet ideology, it has been established for many years, and it was completely congruent with the existing at that time socialist system.
 - a. Many people working at the Russian nuclear facilities still share those assumptions and beliefs. But the times have changed, and the Soviet MPC&A design became inadequate to the new times and to the new more democratic environment (some fundamental changes took place in the Russian society over the past ten years). At the same time, the society has not achieved the level of democracy that the western countries have. As a result, the MPC&A program design that US laboratories are applying may be appropriate for a future Russia, but not today's.
 - b. Because the MPC&A program in Russia was developed during the Soviet period, its functions are distributed throughout managerial positions. Historically in Russia, there was not an MPC&A manager at the facility; each person at his/her level was responsible for the nuclear material (NM) present. There was therefore no formal organization to carry out MPC&A activities. Production managers who have MPC&A responsibilities in addition to their primary activities do not view MPC&A tasks as their main tasks. This creates a fundamental conflict of interest. This conflict creates a higher safeguards (diversion) risk, since those in charge of the nuclear material are also responsible for accounting for it. Those people will resist establishment of an independent MC&A organization with “regulatory” authority, - what US prefers. Even at the facilities that have displayed a new MC&A organization, it is highly likely that actual authority still reside with management.
4. The MPC&A program was developed in the US over many years. The changes due to the new technologies, new equipment design, etc. were introduced for the process control and for the MPC&A program roughly at the same time. MPC&A was a part of any facility's operation, it was not avant-garde, nor it was behind the basic technological processes used at the facility. In Russia, the MPC&A system is far ahead of the way the business is run at those facilities, it is a novelty. Russian facility personnel cannot fully support the MPC&A program because they are so far behind in other areas.
5. Nuclear cities and nuclear facilities were harmed more than any other places (except for military bases) during the reformation that has taken place in Russia. Many people have objected to those changes, because they used to be privileged and better off than neighboring towns. Nuclear cities were proud of being treated as a “Moscow suburb.” Now Moscow is far ahead with central government. There may be an outright personal unwillingness to change due to the fact that all changes so far have led to a worsening of the Russian's situation.

The multi-layer model for analysis of the Russian environment is described in Table I. The first level is the facility level—each facility has its own established practices, organizational culture, process operations, etc. The second level is the level of the operating environment, which includes industry standards and regulations, norms and appropriate laws. The next level is the global environment, which is represented by cultural issues, social situations, technology, and

Sustainability Issues. Russian Aspects.

economics. In principle, there is another layer–international environment, but it was not considered here.

Table I. The multi-layer structure to analyze the Russian environment.

Level	Issues
Facility	Employees (psychological issues) Management (established practices, organizational culture) Operating technologies (specifics of the processes employed)
Operating environment	Legal issues (regulations, directives) Industry standards and regulations Safeguards culture
Global environment	Cultural issues Social situation Political issues Economics

There is another dimension to this analysis that reflects the non-homogeneity of the Russian society. The nonhomogeneity has been always present in the Russian life, but for many years it was camouflaged by the Soviet ideology. Russian employees at the nuclear facilities can be considered as an aggregate of various groups, who have their own interests that they would like to protect. Low-level employees see their responsibilities at work increase, but their pay and living standards plummet. Process managers at Russian facilities enjoyed having influence; but now that production work being cut, they do not have influence they once had. MVD forces used to control the perimeters of the facilities, but now there are sometimes private guards. There is a relatively new institution GAN that now has the power to oversee some nuclear power reactors, and in some situations can be more powerful than the director of the inspecting facility (for example, they can suspend the operating license for a nuclear power plant). There are Red Directors of the defense-related nuclear facilities who were basically untouchable in the Soviet society. For many of them, the current situation is a ruin of their own ambitions and personal goals (for example, recall a suicide of the C-70 director). There are a lot of engineers and other R&D specialists who got used to working in Soviet sinecures and are basically inept and unproductive; they are easily threaten by a new sophisticated technology. All of those groups are affected differently by implementation of the new MPC&A system and they will react differently to the changes.

A. Facility Level

Each time a change is introduced at the facility, there will be some resistance. The resistance to changes can come from personal unwillingness to accept innovation, from fear of control over the job, or simply because of lack of necessary skills. (See Table 2 for details.) The facility employees consist of various groups with different interests and attitudes; they can respond differently to the innovation. It is important to understand the dynamics of the situation at the

specific facility. On the one hand, to rely on the personnel who support those innovations, and on the other hand, to see that all the changes are supported by the existing managerial organization.

The facility has been set up to accommodate certain production lines. It has established practices on how things are done. But implementing changes are very often based on “ideal situations” and on the cutting-edge technology. The design has to be based on the input of the “practitioners,” the equipment cannot be “parachuted” into the site with the expectations that the people will start using it immediately. In addition, there can be a gap in understanding and operating new equipment because it is so different from the process equipment.

The whole process at the facility should be analyzed step by step. For example, under old rules, a floor shop worker accepts the materials by checking the documents and signing in a logbook; it takes paper and pencil to do it. But, maybe by the new rules he now needs to use a barcode reader. This person needs to be persuaded why this change is important and be comfortable with it. If a person does not understand that his/her new equipment is a tool to do the job better, that person will muster any excuse to avoid using it. Other issues include timing: will it take more time or less; payments: if it will take more time, will people be paid overtime for doing a new job; will their pay go up because they have more training and experience with new equipment; radiation exposure: will it go up or stay the same. The US program should make sure that the effects of innovations at a facility and their impact on facility functions are considered. The best way to do this type of analysis is to observe how it is done under the old rules and stage how it will be done under the new rules. Maybe it does not have to be done at all facilities (hopefully, they do not differ from each other very much), but on some similar production lines. The things that do not look important for the designers may be of great importance to the users, such as whether their lunch time or performance evaluation will be affected.

B. Operating environment

The Soviet legacy left its print not only on the industry and legal environment but on the whole culture of Russia. Let's discuss how the three main elements: accounting, control, and physical protection have been interpreted in Russia.

There is no concept of accounting and all associated activities in Russia.

In Russia, traditional accounting and all its associated activities (costing, planing, and forecasting) were not developed. Part of the reason is in the Soviet approach to the economy—everything was specified at the highest level for the whole country. On the one hand, it was just simply impossible to stipulate in detail the objectives for all the facilities in the Soviet Union; on the other hand, each facility received a 5-year and 1-year plan with objectives for each quarter. Therefore, the numbers were not substantiated and sometimes did not match. Take an example. At Gosplan (the Central planning authority in USSR), there was one person who oversaw the production of all nuts and bolts in the Soviet Union. This person had the task of forecasting how many bolts and nuts were going to be needed and where they were going to be

needed. This is truly above human capabilities. This was also true for other goods. There were numerous stories in publications about the miscalculations of the needs of population in things like hosiery and school uniforms. Usually, a shortage developed, and the Cabinet of Ministers would hold a meeting and develop a resolution to solve the problem. Sometimes, the government would use gold reserves to buy overlooked necessities abroad. The world was familiar with the shortages of the Soviet economy, long lines, black markets, etc.

Another reason why accounting activities were not developed in Russia was to prove to the world that the Soviet economy was the most efficient in the world, what was easier said than done. This slogan of superiority of the Soviet economy was stated; and it could not be changed. So there were numerous calculations to support this assertion. Economists created a whole school of thought that provided several ways of proving it. But because all of the figures (economical development, growth, productivity, utilization ratio, etc.) had to be substantiated, it resulted in shady operations that are prevalent at each Russian facility, from shoe factories to the munitions plants. The Director of a facility (manager of the shop, line process engineer, warehouse manager, etc.) always had a little bit of material of unfinished product in stock, so if the factory was low in fulfilling a quota, he would use his unfinished product in the stock to fulfill his quota.

The Soviet economy and its statistics were faulty sciences: the conclusions were made not on the numbers provided but beforehand that, so the real numbers had to be altered to match the conclusions. One of the ways to do it was to ignore accounting, and this practice was used broadly.

At any Russian facility, basically there is no accounting for personal efforts: people are hired to work as an engineer or a physicist, they do not put on their timesheets how much time they spent working on a particular project, their salary is fixed, and their manager should like what they are doing. However, there is no data on what they are doing and for how long. If the worker works on a piece-by-piece basis, there are a lot of stashes or rework, unfinished products, things to finish on a rainy day, etc.

If the project cannot be supported by a required number of engineers. Each organizational structure was fixed by a supervising authority. For example, a laboratory had one manager, one deputy, x-number of research physicists, y-number of engineers, and z-number of laboratory assistants), then the people were hired as cleaning personnel, technicians, cooks, etc. (whatever occupation was vacant at that time) and worked on a project as an engineer, programmer, etc. This model is still used today. Thus, it is difficult to calculate how much time and effort is spent on finishing a particular project.

There is poor understanding of planing.

In defense-related facilities especially, very often the cost was not a constraint, the project should be finished by the date (the date provided by the central authority), so if the need arose, everybody had to work on this project—it was called "storming." Other facilities/institutes were forced to participate in the defense-related work. For example, at Moscow State University, the training and research budget had about 15% of their budget spent on defense-related projects. This would make the cost to support the defense-related complex look less at the state level. The employees of non-defense facilities also had to "fill the gaps" in other areas—

Sustainability Issues. Russian Aspects.

collect potatoes on the farm, load cabbage to go to the stores, etc. The cost of those activities were never calculated. The army is widely used for building and road construction. Many examples of this type of abuse exist.

As a result of it, **nobody knows what costs what**. For costing, economists used specially issued tables and would copy the numbers from them. The central authority established this practice. The cost to manufacture a particular piece cost x-rubles, and the facility had to believe it, even in times when specific figures at the facility would have told otherwise. There were some corrections for the tables: the Far North or Far East had heating and transportation corrections. But for the facilities in Georgia, Ukraine, Moscow, or a tiny village in the countryside, the cost was the same and often unrealistic. Even right now some things are not accounted for; for example, the water and gas payments are calculated on the number of the people living in the apartments, not on the amount of water or gas actually used.

The central authority was never really interested in knowing the real figures on economics, it was much safer to believe what was written and never question it.

Another reason why accounting is not used is due to the structure of the payment system. The salary is only part of the employees' compensation. The facilities provide its employees with housing, daycare, medical services, and summer housing. The higher the position the person has, the more privileges he/she is entitled to.

But the MPC&A program relies heavily on knowing what is where and in what amount. It goes against all Russian production culture that has been established at the facilities. If everybody knows everything, and the output is short at the facility, there are no backup stock or unfinished product to use. The production managers will look bad. Another item related to this one is environmental discharges and material spoilage. The Russian industrial facilities were notorious for polluting the environment; when the numbers are known, the managers can be exposed regarding the credentials of environmental protection. Accounting is like bringing a bright light into the place where business has been conducted in twilight.

The control in the Soviet system was based on secrecy, fear of severe punishment, and lack of any options or choices.

The nuclear cities were kept secret not only from foreign countries but also from fellow Russian citizens. The people who worked and lived in the closed cities had to assume somebody else's identity from another organization in a close-by town when they went to conferences or on vacations. This practice was lifted only a few years ago, possibly as late as 1993. Nobody knew what was going on in some of the facilities. All of the people who were selected to work at nuclear facilities were screened by security (1st Department, KGB). All of the people who were promoted to managerial positions had to be members of the Communist Party, so they were subjects of double control—from the line managers and from the party bosses. Reporting (snitching) on coworkers was encouraged and often used. (Some people claimed that every group of college students, 30-35 people, had its own informer who would report periodically on

how the students were doing. Usually, the informers were the people who were not qualified for their positions and could be dismissed or were “inferior” because of some other factors and, thus, could be exploited by the KGB.) The punishment was stiff, for example, 15 years in prison for misplacing a classified paper. Only 10% of the population belonged to the Communist Party, but all of the supervisors, military officers, and leaders were Communists. People joined the Party not because of their personal beliefs in the goals of building a communistic state, but because of ambition or out of necessity. The minute the person joined the ranks, he/she would have to listen to all of the propaganda speeches, attend all meetings, promote the party line among fellow workers, and carry out party assignments. Thus, the Soviet MPC&A approach addressed the issues of the insider threat with careful screening and control of the people who were involved in the programs. Plus, the people who worked at the nuclear facilities were going to work at those facilities until their retirement. The choices were limited: the person had an apartment from the facility and worked for the facility, basically there was no where else for the employee to go; the cities were closed from outsiders, and the whole country was behind an iron curtain. Everyone who worked at those facilities could not meet with a foreigner (except when it was permitted in advance), including comrades from Eastern Europe. The state did all it could to shape the people using the same mold everywhere: party membership, Soviet ideology, Russian language spoken, insider spying (it was promoted as the party helping society when women were encouraged to go to the local party committees with the problems of drinking or unfaithful husbands and misbehaving children.)

Modern Russia can offer more lifestyle choices to her people.

Right now the situation is changing and it is accepted to be different (different lifestyles) and to work somewhere for only a period of time instead of making a lifetime commitment. In addition, the services (housing, medicine, and daycare) can be bought now (instead of provided by the employer). There is a market for everything (including nuclear materials). People can travel more or less freely and meet other people. The Soviet-type MPC&A control concept is no longer relevant. But some people, especially the managers at the state-run enterprises, believe that the modern Russia cannot continue for a long time, they resist changing, they still believe it will go back to the old ways, and they would like to preserve what they believe as the best from “the good old days.”

In the Soviet Union, there had been a general disregard for the culture, managerial practices and experiences, and knowledge that still can be felt today. Everything was managed by a command approach. In the area of safeguards, it means that physical protection was considered to be far more important than any other element.

This issue has a long history, beginning with *Das Kapital* by Marx, that promotes the notion that only workers produce but the managers take the results of their labor, to the Bolshevik’s philosophy that the communist party and its doctrine can lead and manage the country through a lathe operator as a chief banker, a kitchen aide as a governor, etc. This concept demonstrates itself at all levels of the society. For example, often the promotions were

Sustainability Issues. Russian Aspects.

based on party achievements (loyalty to the party line), not on technical knowledge and professional abilities.

The Russian society is a very well-educated society, it has almost 100% literacy rate, a lot of people have a college education, but it is a skewed education. The students at school are drilled in science, the colleges mostly produce engineers and physicists, and there is an emphasis on lecture and theoretical understanding of the problem, not on practical solutions. Plus, the country for so long has developed on its own without any outside influences that some of the subjects were “reinventing the wheel,” obsolete, or a sheer fantasy (such as the concept of a collective by Petrovskiy). There is no peer review as such, it is always from the upper level to the lower level (in academia, it goes by the rank of the person and the institute he/she is employed at).

The government manages the country by decree, by fiat; it never created a system of incentives. Even today’s government still believes that if the government wants to achieve something, it should make a resolution or issues a decree. It never tried to give people incentive to do things (like pay taxes). It usually issues a resolution in a form like “do this or otherwise you will be punished,” but it never encouraged a desirable behavior by some indirect measure.

The facilities are run on instructions produced at the central authority, which are very general by their nature. There is no culture of writing and obeying by standard operation procedures issued for a specific facility. The gesture is made to rewrite some of the general instructions to be used at the specific facility, but they still are written as slogans and platitudes in very general terms and do not use any specific words on how to implement all the provisions.

Because there is no standard operating procedures (SOPs) at the facilities, all new employees learn what to do by watching the “elders.” Even industrial plants and factories were run more like craft establishments, where the “trade secrets” were passed from one person to another. Basically none of those things are documented. Sometimes it is very difficult to predict what will happen if y-piece of equipment will be used instead of z-piece of equipment, because the knowledge on how things are done is not documented, and very often even the immediate supervisors are not aware how things are done (how it is practiced instead of how it should be done). This makes each facility “unique.” Even for the similar facilities, there is no consistency on how rules are applied and what rules are relevant; very often only one person at the facility knows the correct solution to the problem - which makes the facility environment more challenging for implementing a consistent and comprehensive MPC&A system.

Because of focusing all efforts on fulfilling the objectives, Russian managers have had a tendency to overlook contingency planing for the things that can go wrong. It is a cultural phenomenon. For example, it is wide spread among the population not to write living wills or make any arrangements in case of death or serious accidents; it is not customary for employees or students to provide information about who should be notified in case of an accident; it is perplexing for the Russians to see a line in a US passport regarding the name of the person who should be notified. All the accidents that were published in the open media have one thing in

common: there were no provisions at the facility made in case of events that took place. For example, the Chernobyl emergency manual never described what should be done if a major accident happened, it contained only provisions for minor mishaps. Schools, colleges, hospitals, and factories do not have any fire drills and clear instructions on what to do; everybody is relying on common sense. Military and nuclear establishments are more prepared in this regard, but because of the cultural attitude, those things (what can go wrong, scenarios, etc.) are never fully considered. It also related to the underdevelopment of Russian laws to protect human life and health.

C. The economic situation in Russia is very grim. It exacerbates all the other problems related to MPC&A implementation because the people are not paid on time, and at the same time the prices and unemployment are rising. It was especially a big blow for the privileged nuclear facilities. All their money comes from the state, which is now bankrupt. Plus those facilities never worried about being efficient; Soviet days were days of free resources and plenty of funding for them. They are facing job cuts, restructuring, and lean operations. Their core missions have changed dramatically. The facility managers do not think much about MPC&A, they are thinking about salaries, electricity, and heating bills. They need to change their production lines and start making things they can sell. For them, MPC&A is a loss of revenues; it takes electricity to operate new equipment, it takes more and higher educated people to do the job, and it will never generate any revenues.

For the people at the bottom of the ranks, it is a dilemma as to why they need to learn more and to do more on their jobs when they are not paid even for the things they are doing now. There were cases reported when people refused to go to their workstations because they were not paid. At this level of desperation, people might simply refuse to learn new things unless they are paid. In addition, there is the depressing influence of simply being cold, hungry, and without future (not to mention the struggle to provide for the families, lack of medical services, medicines).

What can be done ?

1. The US MPC&A Program needs to identify allies in the Russian society by establishing links with various organizations inside and outside of Russian Minatom who can support the MPC&A goals (maybe by establishing international conference on safeguards in Moscow with open participation. The MPC&A Program should be aware of the conflicting interests of some participating parties in Russia and exploit them. For example, Minatom is the #2 exporter (in terms of revenues) in Russia. This is a hi-tech industry versus oil and gas industry (#1 exporter). According to the export agency, Minatom is almost the only industry that increased its production over the past several years. With Russia's money problems there is a lot of pressure on Minatom to bring revenues and reduce costs of operations, and MPC&A is expenditure for the facilities. At the same time, there are political circles (for example, Yabloko movement) that would like to curb export of nuclear technologies abroad.

Sustainability Issues. Russian Aspects.

2. The US should promote safeguards culture in Russia, which will be a good environment to make sure that installed MPC&A systems are functioning. We should sell the MPC&A concept not as a number of elements, but as a whole picture when each element does less alone than in connection with others. The underpinning assumptions of MPC&A in a democratic society should be explained. We should think about a new generation of physicists who will work in the nuclear facility and maybe help Russian academia institutions to devise a class on safeguards for all students in nuclear engineering and physics so the people will be more receptive to the MPC&A ideas when they start working at those facilities.
3. Because the MPC&A Program has to deal with hostile, or worse, clueless holdovers from the old regime, the US side needs to provide broad education to the people involved: trips to other facilities (it does not have to be nuclear facilities), tapes on how MPC&A is carried out at various facilities, general seminars (not just on technical subjects but on things like accountability, planning, and forecasting—why it is important to spend money on things that do not produce revenues, and awareness of insider/outsider threat), discussion-type seminars (for example, single ideology and party presence- as the things of the past; today – a movement toward a democratic society that brings new vulnerabilities; possible solutions). The US side will have to work with upper management on western business practices, conflict resolution, etc. We will also have to be careful not to attack Russian stereotypes, but to show the differences and improvements the US MPC&A model can have. The US side can also show the benefits of using and adhering to SOPs
4. Maybe the MPC&A Program needs to help to pay not just for installing equipment but for its operation with gradual phasing-out support. During the operation phase, the information or lessons learned can be gathered and applied at other facilities.
5. The US site teams need to observe the extent to which the actual people who will be using the equipment, adopt the procedures and take the ownership of their MPC&A duties. We cannot limit ourselves to just to managers who are installing the systems as part of their R&D efforts. On of the way to do it is to develop a site-specific training that not only teaches the basics of operations, but also promotes the purpose and value of the new systems.
6. The MPC&A system designers need to consider the general level of technology employed at the Russian facilities; they should try to keep the MPC&A technology at the same level with major processing technologies (transfer of skills, infrastructure support, basic understanding). In addition, we need to realize that the money should be spent to teach people how to use the new technologies. (Provide a more long-term commitment, which includes more support and more training. This will help prevent newly trained personnel from leaving the facility and going to work somewhere else.)
7. The US site teams need to follow through on all aspects related to the operation of the new MPC&A equipment. Russian facilities often overlook various scenarios when something can go

Sustainability Issues. Russian Aspects.

wrong or even the scenario of irregular operations. In those cases, the newly installed MPC&A systems will not work properly.

8. The US Program should strive to obtain accurate and reliable feedback on what is going on at the Russian facilities using various information, including but not limited to demographics, facility data—turnover rate, etc., and some input from the Russian specialists. Sometimes the Russians cannot verbalize what is going on at their facility, plus there is the old habit to please upper management. So, a more informal approach, such as discussion-type seminars /focus groups/brainstorming sessions might provoke exchange of information and ideas).

Types of Sustainability Obstacles		Specific Groups According to Different Roles at the Facility			Potential Solutions for Identified Obstacles	Recommendations for Immediate Actions	
		Facility End-users	Russian Facility MPC&A Project Team Personnel	Facility leadership/Upper management			
Psychology (general considerations)	New technologies and practices that require very different skills than previous MPC&A methodology	Resistance to innovations, fear of losing control; concerns over increased responsibilities. Lack of necessary skills/knowledge (fear to operate) + very expensive equipment (fear to use -- monthly salary is \$30, piece of equipment is \$500K), manuals often are in English and hard to understand. The new system is more rigid than the old one.	Favorable attitude: like to work on the projects (extra\$, trips abroad, interesting contacts) + more responsibilities (more control)	Do not look good in those interactions. Other people are giving advises/recommendations, tell how to run facility); shifts in the chain of command. Perception: no additional value for the facility	Regulations. Training (not only capabilities and instructions on how to use but with demonstrations). Training: experienced - nonexperienced groups. Conflict resolution skills (esp for inspections, audits) Feeling of involvement/participation.	Document established practices at the facility and assure that MPC&A enhancements are compatible with these constraints	Facility - established practices - organizational culture;
Facility-specific (established practices organizational culture)	Disconnect - between upper managers who do not support and MPC&A program implementors; various organizational cultures (specific needs, requirements that are not addressed); the design and implementation are often driven by technical capabilities than specific practices/needs (ideal solutions, which are often away from real practices)	Usually there is no input from them during the design phase; possible miscommunications (US info goes to MPC&A managers, on the way down some info is distorted/lost); knowledge that facility leadership does not support MPC&A activities (all organizations have a strict hierarchical structure)	Enthusiasts	MPC&A will be a liability for the facility (maintenance, repairs, spare parts, training)	Establish communication channels to obtain more input from end-users; actions to involve higher managers (persuasion that MPC&A enhancements will provide better process control, they will have more info, can develop new capabilities, efficiency will go up (maybe to do a comparison study - before and after in order to persuade (maybe to use the data from Kazakhstan). Develop comprehensive contingency plans (if equipment fails, irregular operations, emergency - full scope from benign mishaps to life-threatening)	Develop comprehensive emergency procedures, develop contingency procedures for irregular operations. Document the organizational culture at the facility and assure that MPC&A enhancements are compatible.	
Operating Environment: industry standards, norms, laws. Overall Safeguards Problems	Lack of Regulations; PP > C&A (secrecy + armed guards as a deterrent = expectations that no one will ever try to take NM + everything belongs to the state (No market, private businesses, customers, initiative = entrepreneurial spirit). Lack of safeguards culture	There are executors (by the book). Why to change, if the book is still the same.	? involved into learning new technologies; actively searching new contracts (driven not by real need but by desire/want)	Do not view things as a problem; the old ways are still good ways; are concerned about revenues. The people who used to do the MPC&A functions were mostly military forces (basically, it was free for an enterprise) - conscripts, not very educated, but MPC&A specialists (especially people doing nuclear measurements, database develops, etc.) are highly qualified, should be paid, are hard to replace (they can easily find employment in another place) - it is much more difficult to deal with them.	US is providing very narrow technical knowledge; the need for educational programs. Regulations. Trips to other nuclear facilities - exposure to safeguards. International agreements (two-side agreements) - the pressure to have MPC&A programs at the facilities.	Information about MPC&A in a democratic society (internal threat and external threat - cannot be addressed the same way as in the Soviet Union times)	Operating environment (industry standards, norms, laws)
Overall General (Cultural) Problems	Lack of accounting concept per se (no analogy - no banks/credit unions; salary - "tip of the iceberg"); no transfer of skills (the same is true about planning/forecasting). Not used to planning/forecastings (central authority - before lack of availability/inflation - now). US is imposing those rules on Russia (growing anti-American sentiment). Precision and accuracy is not high in R programs, why it should be hi in MPC&A. Facilities operate by instructions (central origin) not by SOPs (no experience writing SOPs, etc.). Lack of regulations (or regulations are not enforced). Ideological dogmatism.	? Never worked with US people (maybe never even met them), mistrust, "it was better during the Soviet times." Never worked by SOPs (used instructions instead).	Some of them know first hand about superiority of Western business practices and technology; were able to more or less adapt to the recent changes in the country and the world.	MPC&A is not a priority. Could not admit that US won the Cold War. Some of them think that Russia should go back in her development (to the Soviet Union times). May even resist the (overall) changes. MPC&A used to fit to the Soviet philosophy (Communist party - one ideology; total control, etc.)	Convey the message that accounting and inventory taking is a norm (not just for NM). All nuclear facilities have MPC&A program. Visits to other production sites. Support to create an overseeing body (Duma), regulations. Support for development of the State accounting system.	Educational program. Maybe make a videotape on how MPC&A is conducted at various nuclear facilities.	Global environment (economy, social situation, political issues, technology, ecology)
Economics (as a part of Global environment: economy, political issues, technology).	Economical woes - facilities: insolvency of the facilities; shortages (for ex., paper), spare parts; inavailability of some spare parts; people: no salaries, no overtime pay, no vacation	Maybe cannot work properly (no paper to print - have to copy from the screen); are not paid; why work more/do more/learn new things- if are not paid. Maybe fear of getting fired =replaced by new equipment. Working conditions are getting worse (no heat in the bldg., no light in the bathroom, etc.)	Obtain substantial income working on MPC&A project - the desire to extend/prolong the work. May make the work more complicated than it is (especially in the "grey areas" of certification, testing, and acceptance) in order to continue working on a project. Not interested in implementation & ownership =end of contract.	No additional income from MPC&A work. In the future, MPC&A is an expense. New MPC&A may expose inefficiency, they can be held accountable, for ex., for environmental problems. New MPC&A will rely on more qualified people (higher salaries, more difficult to keep) than the current system. Will need to fire or find new employment for thousands of bookkeepers who are doing MC&A activities now.	Some payments after implementation. Provisions for spare parts/supplies. Long-term goals: diversification, creation of new jobs. Other contracts on training/screening/ (how people will be selected in the future - no Communist party recommendations, future specialists do not have to share the same ideology and may have different life styles.)		