

**POLICY ISSUE**  
(Notation Vote)

April 25, 2001

**SECY-01-0071**

**FOR:** The Commissioners

**FROM:** William D. Travers  
Executive Director for Operations

**SUBJECT:** EXPANDED NRC PARTICIPATION IN THE USE OF THE INTERNATIONAL  
NUCLEAR EVENT SCALE

**PURPOSE:**

To report experience from the NRC's limited participation in the International Nuclear Event Scale (INES) and to consult with the Commission concerning future participation.

**SUMMARY:**

The INES provides a consistent means to convey the significance of a wide range of reactor and materials events to the international community. The NRC has participated in the INES in a very limited manner since December 1992. Since that time, the scope and level of worldwide participation in the INES program has expanded, primarily as the result of efforts by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development.

This paper summarizes the staff's experience with the INES and makes a positive recommendation regarding an increased level of participation. The staff is recommending that

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all events reported to NRC be screened using the INES scale, but only those events rated at *level* 2 or higher on the INES scale be reported to the IAEA, unless another member country specifically requests the rating of a particular event. Events which do not meet these criteria would not be documented nor reported to IAEA on the INES rating form. Based on our experience with the INES we expect approximately one reactor event and no more than five materials events to reach this threshold on an annual basis. This is the first time that the staff has proposed to rate fuel cycle and other materials events using the INES. The screening process would be folded into the existing event evaluations that already occur in the program offices.

### **BACKGROUND:**

The INES is a means for communicating the safety significance of events at nuclear facilities to the public in consistent terms. By putting events into the proper perspective, the INES fosters a common understanding of events among the nuclear community. It was designed by an international group convened in 1989 by the IAEA and the NEA. The INES also reflects French and Japanese experience with similar scales. The INES was initially applied only to events at nuclear power plants. It was later modified for application to all events associated with the civilian nuclear industry. The INES is currently used in more than 60 countries, including all countries with a significant number of power reactor facilities. A description of the INES rating levels, as provided by the IAEA, is provided as Attachment 1.

The NRC implemented a policy of limited participation on a trial basis in Generic Letter 92-09 (December 31, 1992). Under limited participation, the NRC staff evaluates and rates certain power reactor events (those classified as Alert or higher) without requiring any participation by NRC licensees. At the end of the trial period, the NRC staff proposed in SECY 95-098 (April 18, 1995) that the U.S. continue its limited participation under the criteria developed for the trial. This recommendation was subsequently approved by the Commission in a May 23, 1995 staff requirements memorandum (Attachment 2). In that SRM, former Commissioner de Planque suggested that the staff increase participation in the INES "in the spirit of international cooperation." The staff has received repeated requests from the IAEA and NEA as well as from individual member nations to expand the NRC's participation in the INES.

The "One Voice" initiative and the international information exchange system named NEWS (Nuclear Events Web-based System) are activities related to this issue. The Commission has previously expressed interest in the staff's progress regarding the "One Voice" initiative. The goal of this initiative is to enhance communication and coordination among the member agencies of the Federal Radiological Preparedness Coordination Committee (FRPCC) so that the Federal government speaks in a consistent manner following peacetime radiological events or emergencies under the Federal Radiological Emergency Response Plan (FRERP), especially those events or emergencies occurring in foreign countries. The INES program is closely related to "One Voice" in that it provides a consistent means for describing the significance of an event using a numerical rating scale. An October 13, 2000 memorandum from W. Travers to the Commission (Attachment 3) discusses the staff's plans for the "One Voice" initiative. In addition, the memorandum discusses the staff's participation in an ongoing IAEA, NEA, and World Association of Nuclear Operations (WANO) initiative involving the development of an Internet-based international information exchange system named NEWS. The INES is related

to NEWS in that it forms the first level of the three-tiered NEWS. A prototype version of this system has been completed and is currently undergoing pre-operational testing. Final approval for this system is expected to be discussed at the next meeting of the INES National Officers in early 2002. Prior to this meeting the staff will evaluate NEWS and make recommendations to the Commission on the appropriate level of participation and method of implementation. A brief status report on NEWS is provided as Attachment 4.

### **DISCUSSION:**

The limited participation policy recommended by the staff and approved by the Commission required that the staff submit INES reports only for events at commercial power reactor facilities that resulted in the declaration of an ALERT (or higher) emergency classification. Since SECY 95-098 was submitted to the Commission through March 31, 2001, the NRC's limited participation in the INES has resulted in the classification of 20 events at U.S. power reactors. In decreasing order of significance three events have been rated as *level 2*, four events have been rated as *level 1*, eight events have been rated as *level 0, below scale*, and five events have been rated *out of scale*. Eighteen of the events rated had been declared an ALERT or higher; two events which did not meet the emergency classification criteria were of sufficient interest to warrant ratings. Details concerning these ratings can be found in Attachment 5.

To put the INES ratings into perspective, some significant nuclear events and associated ratings are as follows: (1) the Chernobyl reactor event in 1986 would have been rated *level 7* (the highest level); (2) the event at the Kyshtym, USSR, reprocessing facility in 1957 would have been rated *level 6*; (3) the loss-of-coolant accident at Three Mile Island Unit 2 in 1979 would have been rated *level 5*; and (4) the inadvertent criticality at the fuel facility in Tokaimura, Japan, on September 30, 1999 was rated *level 4*. The vast majority of events reported using the INES are rated *level 3* or lower. Most recently, the steam generator tube rupture at Indian Point Unit 2 on February 15, 2000 was rated *level 0*, which is considered to be below the scale.

As documented in previous Commission papers on the development of the INES (SECY 89-266, SECY 90-031, and SECY 92-225), the staff initially doubted the wisdom of assigning a numerical rating to an event or condition and using two systems to report events in the U.S. More recently, SECY 95-098 summarized the staff's experience with the INES during the trial participation period; the staff found that the simultaneous use of the INES and the existing U.S. emergency response scheme did not appear to cause confusion. However, when SECY 95-098 was submitted, the INES program was still primarily oriented toward events at power reactor facilities, and guidance for reporting other events into INES had not been fully developed.

At the March 2000 meeting of the INES National Officers (see Attachment 6), it was apparent that the use of the INES as an international communication tool continues to gain momentum. Representatives from many member countries attended the meeting and discussed their positive experiences with the INES, including the use of the INES to rate nonpower reactor and materials events. The IAEA representatives and the various national officers were highly interested in whether the U.S. would increase its level of participation in the INES program.

The NRC's Strategic Plan encourages participation in international programs such as INES. One of the agency's strategies to support U.S. interests in this arena is to "enhance integration of international activities in the NRC." Using the INES puts our domestic events in an internationally understood frame of reference and provides an effective tool to support the "One Voice" initiative. Further, the INES provides a clear aid to the international stakeholders and encourages other nations to share information about their own events. Increasing our engagement with the international nuclear community can enhance the timely and consistent sharing of information that we want on foreign events.

According to the Strategic Plan, one of the measures of our success in this area is that the outcome of international forums are consistent with U.S. Government objectives. Participation in INES increases our voice at IAEA and helps ensure our Government's views are considered as international policies are developed for implementing such systems as INES and NEWS. The INES National Officers' meeting held biennially at IAEA is a good example. Clearly the Agency's views will be given more weight if we are full participants in the system.

Given the above, the staff believes that it is appropriate to revisit the current policy on participation in the INES. The staff has analyzed the various aspects of participation in the INES program and believes that four alternatives are sufficient for the purpose of examining NRC policy with regard to this issue. The alternatives are: (1) discontinue participation in the INES program; (2) maintain the current policy of limited participation; (3) expand upon the current policy to include screening by the NRC staff of all reported events at power reactors for possible INES rating; and (4) implement a policy of full participation in which all nuclear events (reactor, fuel cycle, materials, and transportation events), including events which fall under the regulatory purview of the Agreement States, are screened by the NRC staff for possible rating on the INES. (A detailed discussion concerning participation alternatives is provided in Attachment 7.) None of the alternatives involve a change to existing NRC emergency preparedness regulations or to licensee emergency planning requirements. The staff intends to communicate the Commission decision regarding future INES participation at the next meeting of the INES National Officers, tentatively scheduled for the spring of 2002.

#### Alternative 1: Non-Participation

The staff considers a policy of nonparticipation in the INES to be contrary to our strategic objectives. Our trial period of limited participation did not result in any adverse impacts or confusion with the existing emergency response classification scheme. Furthermore, limited participation has not resulted in an unreasonable allocation of staff resources.

#### Alternative 2: Limited Participation - Reactor Events Classified as Alert or Higher

The staff believes that the current policy of limited participation is no longer sufficient, based upon the successful use of the INES by other countries to describe events involving the use and transportation of radioactive material, and comments received from representatives of other nations and the IAEA. Their concerns include the U.S. policy of evaluating only a limited number of reactor events for potential INES ratings, and our exclusion of all materials and transportation events from INES review.

### Alternative 3: Expanded Participation - All Reactor Events

A policy of expanded participation in the INES, consisting of the screening of all reactor events would be practical, especially in the light of recent changes in NRC policy toward the evaluation of events for risk significance. The incremental increase in staff resources required for expanded participation would be quite small, and NRC participation in the INES would continue to have minimal impact on NRC licensees. Furthermore, increased awareness of the INES both domestically and abroad could lead to better international stakeholder understanding of the significance of events involving nuclear reactors.

### Alternative 4: Full Participation - All Reactor and Material Events

The staff believes that full participation in the INES, consisting of staff review of all reactor and materials events (with the involvement of the Agreement States when appropriate), is the most desirable alternative. Full participation is defined as the evaluation of all reported nuclear events (reactor, fuel cycle, materials, and transportation events), including events which fall under the regulatory purview of the Agreement States, by the NRC staff for possible rating on the INES. Medical misadministrations are outside the scope of the INES and would not be reviewed by the staff for possible rating. Only events rated at *level 2* or higher would be reported to the IAEA, unless another member country specifically requested the rating of a particular event. Events which do not meet these criteria would not be recorded nor reported. This approach is consistent with the "One Voice" initiative described in COMSECY-00-0024 and subsequently approved by the Commission. These reports would normally be submitted to IAEA within two business days of notification to the NRC. The staff intends to develop appropriate implementing guidance for rating events under the scale that is consistent with the INES, but which reflects the NRC's licensing and design requirements for nuclear devices. The current INES Users Manual does not give proper credit for device design in establishing the rating for lost sources. The staff also intends to submit this guidance to the IAEA for incorporation in the next revision of the INES Users Manual.

Full participation in the INES supports the Agency's Strategic Plan in the international arena and keeps the agency engaged in an area which impacts on U.S. Government interests. Alternative 4 also aids our international stakeholders in meeting their obligations with respect to all U.S. events, including those involving radioactive materials. It is also fully compatible with the "One Voice" initiative because it provides a consistent means for describing the relative significance of events to our international counterparts. The incremental increase in staff resources required for expanded participation would be quite small, and NRC participation in the INES would continue to have minimal impact on NRC licensees, certificate holders and Agreement States. Full participation also fosters the development of personal contacts among staff members with those in other countries. These types of relationships have proven valuable during recent international events when the NRC was seeking first hand event information.

The staff notes that the current emergency classification system has been used successfully within the radiological emergency response community for nearly two decades and, under Alternative 4, the current system would not be altered. However, INES could be used to provide another perspective on the significance of an event when requested by a member state of IAEA. Full

participation will ensure that we have a sufficient number of trained staff members to respond to such requests in a timely manner.

If the Commission approves the staff recommendation for full participation in the INES, NRC staff plans to develop a communication plan. Among other things, this plan will include media and NRC web page communications, a generic communication to reactor and fuel facility licensees, and an All Agreement States letter to inform them of this initiative and explain our respective roles. Agreement States currently report significant events to the NRC Operations Center. These and other reportable events are then entered into the Nuclear Materials Event Database (NMED). No new reporting requirements would be established for Agreement States by implementing the INES. Rather, NRC staff would evaluate each event reported by an Agreement State to make an initial determination of the appropriate INES classification of the event. NRC staff would then consult with the affected Agreement State to solicit their input on the rating. Regardless of the participation alternative selected by the Commission, IRO intends to retain the position of INES National Officer, and to continue to provide overall coordination of the staff's INES event review process.

Agency implementation of INES would have minimal impact on reactor or fuel facility licensees and the Agreement States. NRC staff would complete the INES reporting form for those events reportable to IAEA. Based on a review of the NMED database, it is anticipated that very few Agreement State reported events would be rated using the INES because of the relatively low actual or potential consequences associated with these events. As a result, the estimated impact on the Agreement States from full participation in the INES by NRC is expected to be minimal. The staff's intentions were communicated to the Organization of Agreement States (OAS) executive board during the February 2001 NRC/OAS call. The OAS executive board had a number of questions regarding the INES, but no areas of concern were identified.

In the future, U.S. participation in the INES could be expanded to include all events regarding the civilian use of radioactive materials, including events outside of the regulatory purview of the NRC. Further expansion would require the cooperation of additional governmental organizations, including the Department of Energy, the Environmental Protection Agency, and the Department of Transportation. However, many of the interagency coordination issues could be addressed through the Federal Radiological Preparedness Coordinating Committee (FRPCC), in which NRC participates. The staff is not proposing to implement this action at this time.

### **RESOURCES:**

Currently, the staff resources required for event screening and the preparation and submission of INES reports are provided by IRO. Over the past 5 years, this task has required an average of 10 staff hours (less than 0.01 FTE) per year. If the Commission chooses to continue with Alternative 2, Limited Participation, IRO proposes to shift responsibility for preparation of INES reports to NRR, since NRR already has a group of individuals who specialize in event followup.

The screening of events for INES classification and preparation of the INES reports proposed in Alternatives 3 and 4 could be accommodated within existing resources already allotted for event review and followup by the respective program offices (NRR for reactor events; NMSS for materials and transportation events, including those reported by Agreement States). Both NRR and NMSS have groups of individuals who specialize in this task. For NRR, event screening and preparation of INES reports may actually be less than in previous years due to the declining number of

reportable events. For NMSS, event screening and preparation of INES reports for applicable events would require a minimal increase in effort beyond that already expended for event followup and screening for other purposes (Abnormal Occurrences, etc.). If the Commission chooses either of these alternatives, the staff intends to use the INES reporting threshold used by other member nations for submitting reports. Specifically, only events of *level 2* or higher would be submitted, unless another member country specifically requested the rating of a particular event. The staff estimates that this reporting threshold will result in approximately one reactor report and fewer than five materials reports being filed per year. IRO would continue to provide overall coordination of the staff's INES event review process and arrange for periodic training as required. No new OMB clearance would be required for the staff to proceed with Alternatives 3 or 4. However, Alternative 4 would affect certain options that will be offered to the Commission in the National Materials Program paper that would terminate NRC tracking of Agreement State events.

The staff will develop a Management Directive to provide staff guidance regarding the implementation of the INES based upon the alternative selected by the Commission. Resources required to develop the Management Directive, and develop and implement the communications plan are estimated to require less than 0.1 FTE, which is within the IRO budget for FY 2001 and FY 2001.

#### **COORDINATION:**

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections. The Office of International Programs and the Office of Public Affairs have reviewed this paper and have concurred with the staff's recommendations.

#### **RECOMMENDATIONS:**

The staff recommends that the Commission approve Alternative 4, Full Participation, which would increase the scope of NRC participation in the International Nuclear Event Scale while using minimal additional resources.

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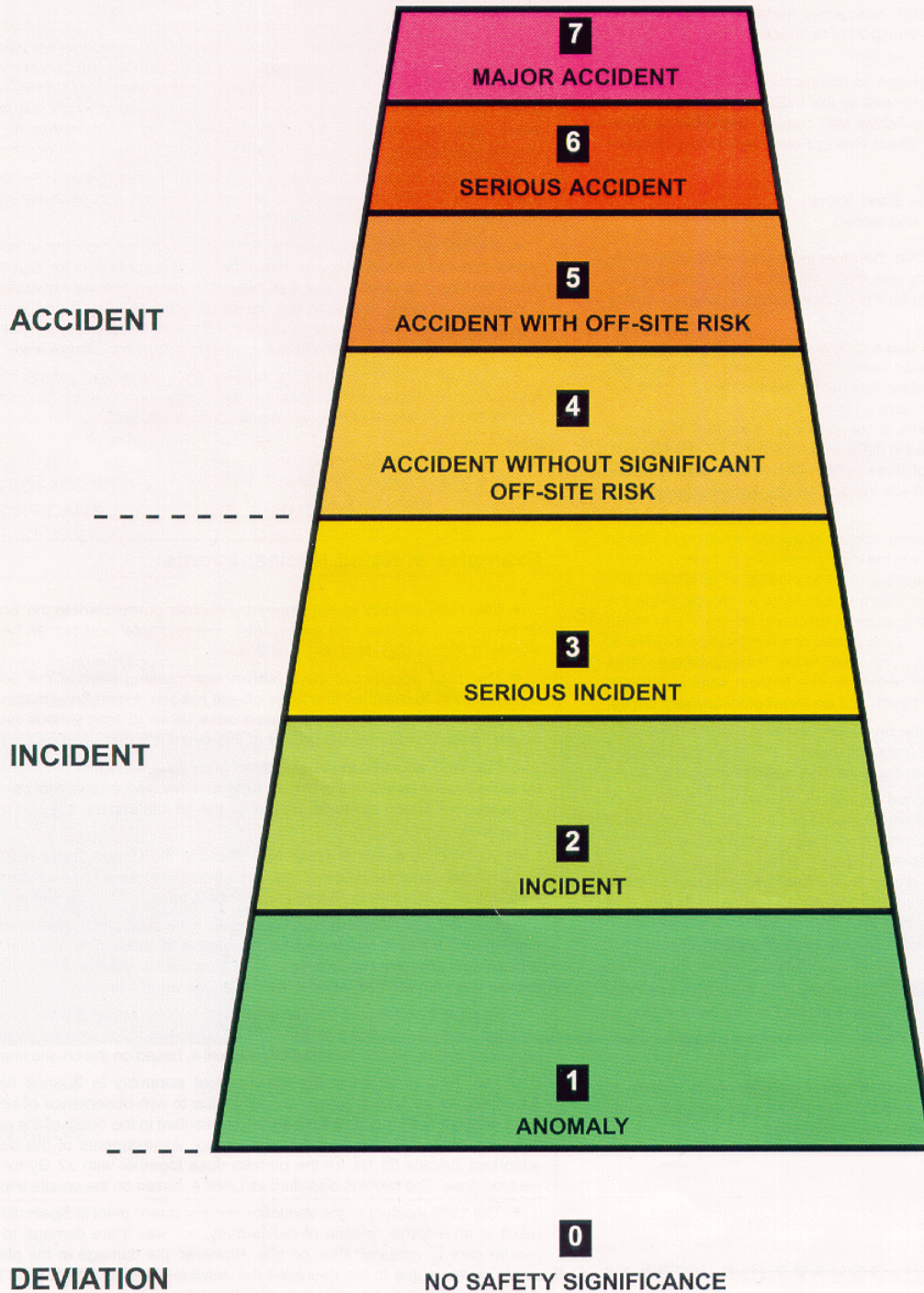
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- Attachments:
1. Description of INES Levels (provided by IAEA)
  2. SRM SECY-95-098
  3. October 13, 2000, Memorandum from W. Travers to Commissioners
  4. Description of NEWS
  5. INES Reports (1995-2000)
  6. Trip Report - Meeting of INES National Officers Conducted in Vienna, Austria, March 29-31, 2000 (**SENSITIVE NON-PUBLIC**)
  7. INES Participation Alternatives



# The International Nuclear Event Scale

For prompt communication of safety significance





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## General Description of the Scale

The International Nuclear Event Scale (INES) is a means for promptly communicating to the public in consistent terms the safety significance of events reported at nuclear installations. By putting events into proper perspective, the Scale can ease common understanding among the nuclear community, the media, and the public. It was designed by an international group of experts convened jointly in 1989 by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development. The Scale also reflects the experience gained from the use of similar scales in France and Japan as well as from consideration of possible scales in several other countries.

The Scale was initially applied for a trial period to classify events at nuclear power plants and then extended and adapted to enable it to be applied to any event associated with radioactive material and/or radiation and to any event occurring during transport of radioactive material. It is now operating successfully in over 60 countries.

The INES Information Service, the communication network built up on request receives from and disseminates to the INES National Officers of 60 Member States, Event Rating Forms that provide authoritative information related to nuclear events. Event Rating Forms are circulated when events are significant for:

- operational safety (INES level 2 and above)
- public interest (INES level 1 and below)

The communication process has therefore led each participating country to set up a structure which ensures that all events are promptly rated using the INES rating procedure to facilitate communication whenever they have to be reported outside.

Events are classified on the Scale at 7 levels; the upper levels (4–7) are termed accidents and the lower levels (1–3) incidents. Events which have no safety significance are classified below scale at level 0 and are termed "deviations". Events which have no safety relevance are termed "out of scale". The structure of the Scale is shown opposite, in the form of a matrix with key words. Each level is defined in detail within the *INES User's Manual*. Events are considered in terms of three safety attributes or criteria represented by each of the columns: off-site impact, on-site impact, and defence in depth degradation.

The second column in the matrix relates to events resulting in off-site releases of radioactivity. Since this is the only consequence having a direct effect on the public, such releases are understandably of particular concern. Thus, the lowest point in this column represents a release giving the critical group an estimated radiation dose numerically equivalent to about one-tenth of the annual dose limit for the public; this is classified as level 3. Such a dose is also typically about one-tenth of the average annual dose received from natural background radiation. The highest level is a major nuclear accident with widespread health and environmental consequences.

The third column considers the on-site impact of the event. This category covers a range from level 2 (contamination and/or overexposure of a worker) to level 5 (severe damage to the reactor core or radiological barriers).

All nuclear facilities are designed so that a succession of safety layers act to prevent major on-site or off-site impact and the extent of the safety layers provided generally will be commensurate with the potential for on- and off-site impact. These safety layers must all fail before substantial off-site or on-site consequences occur. The provision of these safety layers is termed "defence in depth". The fourth column of the matrix relates to incidents at nuclear installations or during the transportation of radioactive materials in which these defence in depth provisions have been degraded. This column spans the incident levels 1–3.

An event which has characteristics represented by more than one criterion is always classified at the highest level according to any one criterion.

Events which do not reach the threshold of any of the criteria are rated below scale at level 0.

The back page of this leaflet gives typical descriptions of events at each level together with examples of the classification of nuclear events which have occurred in the past at nuclear installations.

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## Using the Scale

- The detailed rating procedures are provided in the *INES User's Manual*. This leaflet should not be used as the basis for rating events as it only provides examples of events at each level, rather than actual definitions.

- Although the Scale is designed for prompt use following an event, there will be occasions when a longer time-scale is required to understand and rate the consequences of an event. In these rare circumstances, a provisional rating will be given with confirmation at a later date. It is also possible that as a result of further information, an event may require reclassification.

- The Scale does not replace the criteria already adopted nationally and internationally for the technical analysis and reporting of events to Safety Authorities. Neither does it form a part of the formal emergency arrangements that exist in each country to deal with radiological accidents.

- Although the same Scale is used for all installations, it is physically impossible at some types of installation for events to occur which involve the release to the environment of considerable quantities of radioactive material. For these installations, the upper levels of the Scale would not be applicable. These include research reactors, unirradiated nuclear fuel treatment facilities, and waste storage sites.

- The Scale does not classify industrial accidents or other events which are not related to nuclear or radiological operations. Such events are termed "out of scale". For example, although events associated with a turbine or generator can affect safety related equipment, faults affecting only the availability of a turbine or generator would be classified as out of scale. Similarly, events such as fires are to be considered out of scale when they do not involve any possible radiological hazard and do not affect the safety layers.

- The Scale is not appropriate as the basis for selecting events for feedback of operational experience, as important lessons can often be learnt from events of relatively minor significance.

- It is not appropriate to use the Scale to compare safety performance among countries. Each country has different arrangements for reporting minor events to the public, and it is difficult to ensure precise international consistency in rating events at the boundary between level 0 and level 1. The statistically small number of such events, with variability from year to year, makes it difficult to provide meaningful international comparisons.

- Although broadly comparable, nuclear and radiological safety criteria and the terminology used to describe them vary from country to country. The INES has been designed to take account of this fact.

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## Examples of Rated Nuclear Events

- The 1986 accident at the Chernobyl nuclear power plant in the Soviet Union (now in Ukraine) had widespread environmental and human health effects. It is thus classified as Level 7.

- The 1957 accident at the Kyshtym reprocessing plant in the Soviet Union (now in Russia) led to a large off-site release. Emergency measures including evacuation of the population were taken to limit serious health effects. Based on the off-site impact of this event it is classified as Level 6.

- The 1957 accident at the air-cooled graphite reactor pile at Windscale (now Sellafield) facility in the United Kingdom involved an external release of radioactive fission products. Based on the off-site impact, it is classified as Level 5.

- The 1979 accident at Three Mile Island in the United States resulted in a severely damaged reactor core. The off-site release of radioactivity was very limited. The event is classified as Level 5, based on the on-site impact.

- The 1973 accident at the Windscale (now Sellafield) reprocessing plant in the United Kingdom involved a release of radioactive material into a plant operating area as a result of an exothermic reaction in a process vessel. It is classified as Level 4, based on the on-site impact.

- The 1980 accident at the Saint-Laurent nuclear power plant in France resulted in partial damage to the reactor core, but there was no external release of radioactivity. It is classified as Level 4, based on the on-site impact.

- The 1983 accident at the RA-2 critical assembly in Buenos Aires, Argentina, an accidental power excursion due to non-observance of safety rules during a core modification sequence, resulted in the death of the operator, who was probably 3 or 4 metres away. Assessments of the doses absorbed indicate 21 Gy for the gamma dose together with 22 Gy for the neutron dose. The event is classified as Level 4, based on the on-site impact.

- The 1989 incident at the Vandellós nuclear power plant in Spain did not result in an external release of radioactivity, nor was there damage to the reactor core or contamination on site. However, the damage to the plant's safety systems due to fire degraded the defence in depth significantly. The event is classified as Level 3, based on the defence in depth criterion.

- The vast majority of reported events are found to be below Level 3. Although no examples of these events are given here, countries using the Scale may individually wish to provide examples of events at these lower levels.

# Basic Structure of the Scale

(Criteria given in matrix are broad indicators only)  
Detailed definitions are provided in the INES User's Manual

	CRITERIA OR SAFETY ATTRIBUTES		
	OFF-SITE IMPACT	ON-SITE IMPACT	DEFENCE IN DEPTH DEGRADATION
7 MAJOR ACCIDENT	MAJOR RELEASE: WIDESPREAD HEALTH AND ENVIRONMENTAL EFFECTS		
6 SERIOUS ACCIDENT	SIGNIFICANT RELEASE: LIKELY TO REQUIRE FULL IMPLEMENTATION OF PLANNED COUNTERMEASURES		
5 ACCIDENT WITH OFF-SITE RISK	LIMITED RELEASE: LIKELY TO REQUIRE PARTIAL IMPLEMENTATION OF PLANNED COUNTERMEASURES	SEVERE DAMAGE TO REACTOR CORE/RADIOLOGICAL BARRIERS	
4 ACCIDENT WITHOUT SIGNIFICANT OFF-SITE RISK	MINOR RELEASE: PUBLIC EXPOSURE OF THE ORDER OF PRESCRIBED LIMITS	SIGNIFICANT DAMAGE TO REACTOR CORE/RADIOLOGICAL BARRIERS/FATAL EXPOSURE OF A WORKER	
3 SERIOUS INCIDENT	VERY SMALL RELEASE: PUBLIC EXPOSURE AT A FRACTION OF PRESCRIBED LIMITS	SEVERE SPREAD OF CONTAMINATION/ACUTE HEALTH EFFECTS TO A WORKER	NEAR ACCIDENT NO SAFETY LAYERS REMAINING
2 INCIDENT		SIGNIFICANT SPREAD OF CONTAMINATION/ OVEREXPOSURE OF A WORKER	INCIDENTS WITH SIGNIFICANT FAILURES IN SAFETY PROVISIONS
1 ANOMALY			ANOMALY BEYOND THE AUTHORIZED OPERATING REGIME
0 DEVIATION	NO	SAFETY	SIGNIFICANCE
OUT OF SCALE EVENT	NO SAFETY RELEVANCE		

# The International Nuclear Event Scale

For prompt communication of safety significance

LEVEL/ DESCRIPTOR	NATURE OF THE EVENTS	EXAMPLES
<b>ACCIDENTS</b>  7  <b>MAJOR ACCIDENT</b>	<ul style="list-style-type: none"> <li>External release of a large fraction of the radioactive material in a large facility (e.g. the core of a power reactor). This would typically involve a mixture of short and long-lived radioactive fission products (in quantities radiologically equivalent to more than tens of thousands of terabecquerels of iodine-131). Such a release would result in the possibility of acute health effects; delayed health effects over a wide area, possibly involving more than one country; long-term environmental consequences.</li> </ul>	Chernobyl NPP, USSR (now in Ukraine), 1986
6  <b>SERIOUS ACCIDENT</b>	<ul style="list-style-type: none"> <li>External release of radioactive material (in quantities radiologically equivalent to the order of thousands to tens of thousands of terabecquerels of iodine-131). Such a release would be likely to result in full implementation of countermeasures covered by local emergency plans to limit serious health effects.</li> </ul>	Kyshtym Reprocessing Plant, USSR (now in Russia), 1957
5  <b>ACCIDENT WITH OFF-SITE RISK</b>	<ul style="list-style-type: none"> <li>External release of radioactive material (in quantities radiologically equivalent to the order of hundreds to thousands of terabecquerels of iodine-131). Such a release would be likely to result in partial implementation of countermeasures covered by emergency plans to lessen the likelihood of health effects.</li> <li>Severe damage to the installation. This may involve severe damage to a large fraction of the core of a power reactor, a major criticality accident or a major fire or explosion releasing large quantities of radioactivity within the installation.</li> </ul>	Windscale Pile, UK, 1957  Three Mile Island, NPP, USA, 1979
4  <b>ACCIDENT WITHOUT SIGNIFICANT OFF-SITE RISK</b>	<ul style="list-style-type: none"> <li>External release of radioactivity resulting in a dose to the critical group of the order of a few millisieverts.* With such a release the need for off-site protective actions would be generally unlikely except possibly for local food control.</li> <li>Significant damage to the installation. Such an accident might include damage leading to major on-site recovery problems such as partial core melt in a power reactor and comparable events at non-reactor installations.</li> <li>Irradiation of one or more workers resulting in an overexposure where a high probability of early death occurs.</li> </ul>	Windscale Reprocessing Plant, UK, 1973 Saint-Laurent NPP, France, 1980  Buenos Aires Critical Assembly, Argentina, 1983
<b>INCIDENTS</b>  3  <b>SERIOUS INCIDENT</b>	<ul style="list-style-type: none"> <li>External release of radioactivity resulting in a dose to the critical group of the order of tenths of millisievert.* With such a release, off-site protective measures may not be needed.</li> <li>On-site events resulting in doses to workers sufficient to cause acute health effects and/or an event resulting in a severe spread of contamination for example a few thousand terabecquerels of activity released in a secondary containment where the material can be returned to a satisfactory storage area.</li> <li>Incidents in which a further failure of safety systems could lead to accident conditions, or a situation in which safety systems would be unable to prevent an accident if certain initiators were to occur.</li> </ul>	Vandellos NPP, Spain, 1989
2  <b>INCIDENT</b>	<ul style="list-style-type: none"> <li>Incidents with significant failure in safety provisions but with sufficient defence in depth remaining to cope with additional failures. These include events where the actual failures would be rated at level 1 but which reveal significant additional organisational inadequacies or safety culture deficiencies.</li> <li>An event resulting in a dose to a worker exceeding a statutory annual dose limit and/or an event which leads to the presence of significant quantities of radioactivity in the installation in areas not expected by design and which require corrective action.</li> </ul>	
1  <b>ANOMALY</b>	<ul style="list-style-type: none"> <li>Anomaly beyond the authorised regime but with significant defence in depth remaining. This may be due to equipment failure, human error or procedural inadequacies and may occur in any area covered by the scale, e.g. plant operation, transport of radioactive material, fuel handling, waste storage. Examples include: breaches of technical specifications or transport regulations, incidents without direct safety consequences that reveal inadequacies in the organisational system or safety culture, minor defects in pipework beyond the expectations of the surveillance programme.</li> </ul>	
<b>DEVIATIONS</b>  0  <b>BELOW SCALE</b>	<ul style="list-style-type: none"> <li>Deviations where operational limits and conditions are not exceeded and which are properly managed in accordance with adequate procedures. Examples include: a single random failure in a redundant system discovered during periodic inspections or tests, a planned reactor trip proceeding normally, spurious initiation of protection systems without significant consequences, leakages within the operational limits, minor spreads of contamination within controlled areas without wider implications for safety culture.</li> </ul>	<b>NO SAFETY SIGNIFICANCE</b>

\* The doses are expressed in terms of effective dose equivalent (whole dose body). Those criteria where appropriate can also be expressed in terms of corresponding annual effluent discharge limits authorized by National authorities.



International Atomic Energy Agency  
Wagramerstrasse 5  
A-1400 Vienna, Austria



OECD Nuclear Energy Agency  
Le Seine Saint-Germain-12  
Boulevard des Iles  
92130 Issy-les-Moulineaux, France

May 23, 1995

MEMORANDUM TO: James M. Taylor  
Executive Director for Operations

FROM: John C. Hoyle, Secretary /s/

SUBJECT: SECY-95-098 - NRC PARTICIPATION IN WORLD USE  
OF THE INTERNATIONAL NUCLEAR EVENT SCALE

The Commission (with all Commissioners agreeing) has approved Alternative 2 continuing the current policy of limited participation in use of the International Nuclear Event Scale (INES) for power reactors.

Commissioner de Planque suggested that events at facilities other than power reactors should also be reported if they have initiators and result in an ALERT declaration (or higher). She also suggested a goal for assessing the event and submitting reports to INES of 48 hours in accordance with the IAEA goal. Commissioner de Planque also stated that the staff need not systematically review events that do not involve initiators solely for purposes of INES reporting, but that, if during the normal processing of events, a significant failure in safety provisions is identified, it should be reported in the spirit of international cooperation.

cc: The Chairman  
Commissioner Rogers  
Commissioner de Planque  
Commissioner Jackson  
OGC  
OCA  
OIG  
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)

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SECY NOTE: THIS SRM, SECY-95-098, AND THE VOTE SHEETS OF ALL COMMISSIONERS WILL BE MADE PUBLICLY AVAILABLE 5 WORKING DAYS FROM THE DATE OF THIS SRM.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 13, 2000

MEMORANDUM TO: Chairman Meserve  
Commissioner Dicus  
Commissioner Diaz  
Commissioner McGaffigan  
Commissioner Merrifield

FROM: William D. Travers *(/RA by W. D. Travers)*  
Executive Director for Operations

SUBJECT: PLANS FOR THE "ONE VOICE" INITIATIVE AND RESULTS OF  
THE SEPTEMBER 20, 2000, FEDERAL RADIOLOGICAL  
PREPAREDNESS COORDINATING COMMITTEE MEETING  
FOR YOUR INFORMATION

As a result of the lessons learned from the Y2K Federal response and coordination effort and the Federal response to the criticality event in Tokai-Mura, Japan, the staff is pursuing an initiative which is referred to as "One Voice." The goal of this initiative is to enhance communication and coordination among the member agencies of the Federal Radiological Preparedness Coordinating Committee (FRPCC) so that the Federal government speaks in a consistent manner following peacetime radiological events or emergencies under the Federal Radiological Emergency Response Plan (FRERP), especially those events or emergencies occurring in foreign countries.

The staff described its plans for the "One Voice" initiative to the Commission in COMSECY-00-0024 (dated May 12, 2000). The first of two documents attached to that memorandum was a "One Voice" Initiative Concept. The document provided background information on the FRERP, explained the need for the "One Voice" initiative, and gave the status of Incident Response Operations (IRO) activities related to this issue. The second document was a proposed letter from Dr. Frank J. Congel, Director, IRO, to Mr. Russell Salter, Chairman, FRPCC. After Commission approval, this letter was issued on June 27, 2000, to formally request the FRPCC Chairman to distribute the "One Voice" initiative to the FRPCC members (17 Federal agencies) and to raise it as a topic for discussion at the next FRPCC meeting. The letter also revisited the purpose of the FRERP which recognizes appropriate Lead Federal Agencies (LFA) for responses to both foreign and domestic events with potential radiological consequences.

The FRPCC Chairman subsequently added the "One Voice" initiative to the agenda for the FRPCC meeting, which was held on September 20, 2000. During this meeting, Dr. Charles L. Miller briefed FRPCC members on the purpose and justification for the "One Voice" initiative; on topics the Commission recommended for discussion, which were documented in Staff

Requirements Memorandum COMSECY-00-0024<sup>1</sup> (dated June 16, 2000); and on the NRC's plans regarding this issue. As set forth in the June 27, 2000, letter to Mr. Salter; Dr. Miller also volunteered the NRC staff to chair an applicable committee or subcommittee that would be assigned or formed to resolve the pending issues and establish the appropriate protocols.

After candid discussions, the nine FRPCC members in attendance voted unanimously to assign the issue to the existing Response and Recovery Subcommittee (which wrote and later revised the FRERP). It was decided that an NRC representative would co-chair the subcommittee and that the co-chairmanship might switch to other agencies according to the issues. It was also decided that subcommittee membership would include (at a minimum) representatives from the Federal Emergency Management Agency's (FEMA) Preparedness, Training, and Exercises group, FEMA's Response and Recovery group, and the Conference of Radiation Control Program Directors (CRCPD). The CRCPD representatives would speak for State interests. Representatives from various other LFAs, such as the Environmental Protection Agency, stated that they too would plan to participate and would support the subcommittee in implementing the "One Voice" initiative.

The FRPCC Chairman asked if the NRC would be willing to take a lead role in developing a mission statement and a proposed schedule for the Response and Recovery Subcommittee. The mission statement would task the subcommittee with implementation and resolution of the "One Voice" initiative. The IRO staff is currently working on the development of this mission statement.

The IRO staff is also aware of an ongoing International Atomic Energy Agency (IAEA), Nuclear Energy Agency (NEA), and World Association of Nuclear Operators (WANO) initiative involving the development of an international information exchange system. This initiative is in an early stage of development. The staff will inform the Commission about the details of this initiative in separate correspondence when additional details are known. The staff will keep abreast of the initiative to assess its usefulness in conjunction with the "One Voice" initiative."

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<sup>1</sup>In Staff Requirements Memorandum COMSECY-00-0024 (dated June 16, 2000), the Commission directed the NRC staff to ensure that discussions should address and resolve concerns that the Federal Government needs to speak with "One Voice" during such emergencies and that discussions should encompass a broad range of alternatives including the following: 1) a decentralized approach in which each agency responds to inquiries using a common base of information; 2) a centralized approach in which the LFA is responsible for all external communications; 3) an approach in which the White House is responsible for all external communications; 4) an approach in which the FRPCC itself is responsible for all external communications; and 5) a graded approach where responsibility for communication would change as the scope or intensity of the emergency situation changes or as public concerns escalate. The Commission also directed the NRC staff to recommend that the FRPCC seek routine involvement by a White House agency in its activities and in individual agencies' emergency exercises when the scenario, if real, likely would draw significant media attention. In addition, the IRO staff was tasked with identifying the White House point of contact for emergencies in which the NRC would be the LFA and seeking a White House official at least annually in an NRC reactor emergency preparedness exercise.

As directed by the June 16, 2000 Staff Requirements Memorandum, COMSECY-00-0024, the IRO staff is establishing a point of contact in the White House. The outcome will be reported via separate correspondence.

If you have any questions or require any additional information, please contact Leigh Trocine (LXT) at 415-6415.

cc: SECY  
OGC  
OCA  
OCIO  
OIP  
OPA  
CFO  
CIO

# Nuclear Events Web-based System (NEWS)

## **BACKGROUND:**

The Nuclear Events Web-based System (NEWS) was created to be used in the case of a significant nuclear event. The information provided by the media is frequently very incomplete and often misleading. Experience has shown that the source of information on nuclear events for the national media is the national experts rather than the experts from the country where the event occurs. These experts are expected to provide information on the nuclear event and an assessment of its possible consequences at a very early stage. It is therefore very important that national experts obtain firsthand information on the nature and scope of a nuclear event. Getting this firsthand information at an early stage has proven to be difficult during past events. It is anticipated that NEWS will provide a means of obtaining this firsthand information on events.

## **DESCRIPTION:**

NEWS is a secure, internet-based communications system that allows for rapid transmission of information among regulators, operators and technical support organizations. Access into NEWS consists of three levels. The first level is reserved for INES national officers and is used to submit INES reports. (The web submittal will eventually replace the current facsimile.) Web-based INES was developed simultaneously with NEWS to minimize costs and to keep the database maintenance workload to a minimum. The second level is for nuclear facilities/utilities. This level provides write access for press releases and related documents. The lowest level, level three, is designed to encourage discussions of ongoing events in near real time by technical experts. Level three is a discussion forum where various discussion threads maybe be started and followed. It is anticipated that level three will provide the most benefit to the average user. The specific detailed guidance regarding authorization, access and use is still being developed by IAEA.

## **STATUS:**

The software to support level three has been developed by IAEA using the YEWS (Y2k Early Warning System) software as a model. A prototype version of this system has been completed and is currently undergoing preoperational testing. This testing is expected to last until the end of 2001. Additional software improvements will be made as experience is gained with the system.

A NEWS user's guide is under development at IAEA along with suggested guidelines for its use. The user's guide will cover the details of operating the software. The guidelines will discuss how NEWS is envisioned to be utilized and the relationship between regulating entities and the facilities they regulate with respect to providing information to NEWS. These steps must be completed before NEWS can be utilized by member states.

NEA has proposed a meeting in mid 2001 among NEA, IAEA, WANO and NRC (as part of our INES working group responsibilities) to develop the appropriate guidelines. The results of this meeting should leave NEA, IAEA and WANO positioned to put out a call for registration and significantly increase participation beyond the group of INES national officers.



## INES REPORTS 1995-2000

<u>Plant</u>	<u>Event Date</u>	<u>Rating</u>	<u>Description</u>
<b>1995</b>			
Robinson 2	2/13/95	OOS	CO2 release in vital area
Waterford 3	3/25/95	OOS	Hazardous gas release from chemical plant
Robinson 2	6/20/95	0	Charging pump relief valve lifted during startup
Waterford 3	7/20/95	0	Ammonia release from fertilizer plant
Salem 1	10/4/95	0	Loss of audible and visual control room annunciators
LaSalle 1	10/31/95	1	Overretraction of TIP probe
<b>1996</b>			
Wolf Creek	1/30/96	2	Frazil ice buildup
Catawba 2	2/6/96	1	Loss of offsite power, reactor trip, safety injection
Palo Verde 2	4/4/96	0	Fire in lighting panel in control room
Clinton	8/19/96	1	Fire on RCIC pump turbine insulation
<b>1997</b>			
Limerick 2	10/9/97	0	EDG fire during testing
<b>1998</b>			
Clinton	2/13/98	0	Loss of shutdown cooling
Limerick 1	4/17/98	OOS	Gas odor in turbine building
Davis-Besse	6/24/98	1	Loss of offsite power and natural circulation cooldown
Fermi	10/8/98	0	Electrical fire in EDG control panel
<b>1999</b>			
San Onofre	3/5/99	OOS	Suspicious device found in protected area
Indian Point 2	8/31/99	2	Reactor trip with loss of electrical buses
Robinson 2	9/29/99	OOS	Tornado sighting within protected area
Waterford 3	11/27/99	2	Loss of RCS inventory while shutdown
<b>2000</b>			
Indian Point 2	2/15/00	0	Steam generator tube leak

\*OOS indicates that the rating was determined to be "Out Of Scale" according to the INES Users Manual

## INES PARTICIPATION ALTERNATIVES

### **Alternative 1: Nonparticipation**

The NRC would discontinue its participation in the INES program. The advantages and disadvantages of nonparticipation in the INES program are summarized below.

#### Advantages

1. Nonparticipation would eliminate a program which, due to limited participation by the NRC, has been of marginal benefit to the worldwide media and public.
2. Nonparticipation would result in a slight savings of staff resources (i.e., less than 0.01 FTE).

#### Disadvantages

1. The United States supports the objectives of the INES and has participated in the development and implementation of the INES program, albeit in a limited fashion. However, nonparticipation in the INES program could be viewed unfavorably by the international community, and would give the United States little or no influence on the further development of this program.
2. The public and media of other participating countries may be confused about the significance of a U.S. event that has not been assigned an INES rating. As a result, additional staff time may be required to describe the event to the media and regulatory counterparts in other countries. Furthermore, the IAEA or another country may assign a rating for an event in the United States. For example, a February 20, 2000, event involving a stolen Co-60 source in Thailand was “unofficially” rated *level 4* by IAEA (“unofficially” because Thailand does not participate in the INES).
3. A decision by the NRC to discontinue participation in the INES program would likely draw criticism from the IAEA and our foreign regulatory counterparts.

### **Alternative 2: Limited Participation**

The NRC would maintain its current policy of limited participation. We would continue to submit an INES rating form only for events at power reactors which resulted in an Alert (or higher) declaration using the emergency classification system defined in NUREG-0654. These reports would continue to be submitted no sooner than 10 business days following the termination of the event. The advantages and disadvantages of limited participation are addressed below.

### Advantages

1. Limited participation ensures that information concerning a subset of significant events (reactor events classified at Alert or above) is consistently communicated to the international community.
2. Limited participation would not involve additional staff resources.

### Disadvantages

1. Maintaining the current limited participation policy could be viewed as a somewhat uncooperative stance by the international community, and could give the United States less influence on the further development and future uses of the INES.
2. Maintaining the current limited participation policy would deprive NRC of the potential benefits of expanded and full participation described below.

### **Alternative 3: Expanded Participation**

The NRC would revise its current level of participation to include the screening of all event reports received from power reactors for possible rating using the INES. NRR would use its existing events assessment process for this review. In accordance with guidance provided by the IAEA, only events rated at *level 2* or higher would be reported to the IAEA, unless another member country specifically requested the rating of a particular event. These reports would be submitted to the IAEA within two business days of notification to the NRC. Events which do not meet these criteria would not be recorded nor reported. Expanded participation in the INES would be transparent to reactor licensees as any data collection required for the rating would be done by NRC staff.

The INES incorporates the use of both “Provisional” and “Final” reports in order to promote prompt reporting of events by member countries. It is conceivable that during certain situations, such as prolonged emergency response to an event at a licensed facility, the staff might issue a preliminary report followed by a final report with a different numerical rating.

INES reports would no longer be submitted solely because an Alert or higher emergency classification was made. Based upon experience in rating events since the NRC began limited participation, the staff has not found any correlation between the declaration of a low level emergency at a power reactor facility and a subsequent INES rating of the event above the reporting threshold (*level 2*) to the IAEA.

### Advantages

1. Expanding participation could ultimately lead to improved international community awareness about the safety significance of all events at U.S. power reactors.
2. As a world leader, the United States would bring an important perspective to this issue and would set a precedent for improving communication throughout the world regarding matters of international nuclear safety.

### Disadvantages

1. Increasing the current level of participation could involve some, albeit small, additional burden on the staff. Note that this may actually be less than in previous years due to the declining number of reportable events. The burden would be distributed among staff (1) investigating and evaluating the reported events, (2) drafting reports, and (3) disseminating the ratings domestically and internationally.
2. Expanded participation could result in increased public attention to power reactor events because of increased international media coverage.

### **Alternative 4: Full Participation**

Previous Commission papers regarding staff participation in the INES defined “full participation” as mandating that NRC licensees rate events on the INES and promptly report the ratings. The staff had concluded that licensees could accurately report the facts and analyze events in a more timely manner. Since then, many of the countries participating in the INES program have decided that ratings are more appropriately assigned by governmental regulatory agencies. For the purposes of this discussion, “full participation” is defined as the evaluation of all nuclear events (reactor, fuel cycle, materials, and transportation events), including events which fall under the regulatory purview of the Agreement States, by the NRC staff for possible rating on the INES. Medical misadministrations are outside the scope of the INES and would not be reviewed by the staff for possible rating. This approach is consistent with the One Voice initiative described in COMSECY-00-0024 and subsequently approved by the Commission.

As with Alternative 3, only events rated at *level* 2 or higher would be reported to the IAEA, unless another member country specifically requested the rating of a particular event. These reports would be submitted within two business days of notification to the NRC. Events which do not meet these criteria would not be recorded nor reported.

### Advantages

1. Supports our Strategic Plan by enhancing the integration of international activities in the NRC.
2. The United States would become a full participant in the INES program in a manner consistent with other countries.
3. Full participation would maintain the United States in a primary position to influence the future use and development of the INES.
4. Full participation would allow the international stakeholders to quickly grasp the significance of U.S. events.

### Disadvantages

1. Increasing the current level of participation could involve some, albeit small, additional burden on the staff. Note that for NRR, this may actually be less than in previous years

due to the declining number of reportable events. The burden would be distributed among staff (1) investigating and evaluating the reported events, (2) drafting reports, and (3) disseminating the ratings domestically and internationally.

2. Full participation could result in increased public attention to certain nuclear materials events because lost and damaged devices and transportation events have the potential to be rated as *level 2* or higher on the INES.