

It has been pointed out that the intent of my presentation is to present an overview of a radiation safety program for MultiModality Hospital. I'm going to attempt to provide and describe some of the different groups that we address in our radiation safety program and the different subject matter that is presented to these individuals. Because of time constraints I'm not going to be able to get into what the specific program is that we will or in detail that we might present to those different groups, but try to maybe give some examples and proceed from there. But, one of the things in putting this together, I was kind of not sure about, in addressing this group that using the word training, as opposed to the word inservice. Because very often we talk about in-servicing personnel and what I came to realize is that the word inservice actually only applies to full-time employees and as I'll describe, and we'll talk about the different groups here, that is not the case in a hospital environment. You actually have a very large contingent of individuals that are not full-time employees that you need to potentially address in your radiation safety program.

The objectives are outlined here as I said the intent is to try to present an overview of a training program, the different groups, the content and in some cases how we address those specific subjects. Now, the purpose is for providing a radiation safety program are identified in terms of the regulatory requirements in parts 19 and specifically in 35 for hospital workers are addressed in nuclear regulatory commission regulations in the ____ State situations there are analogist regulations that are found in the suggested State regulations in part J. We also have requirements, well I shouldn't call them requirements because an accredited agency is not a legal group, but the Joint Commission on the Accreditation of Health Care Organizations in our accreditation manual does have specific standards under their management of human resources standards that specifically address training of hospital workers and there are specific references to safety training in those standards under human resources. Now, the accreditation manuals for hospitals have undergone a tremendous revision over the last ten years. I think it was about ten years ago there were some specific standards in there that addressed safety training pertaining to fluoroscopy. Those have since been removed and have gone to a more general nature in terms of what safety training needs to be provided. Another purpose is to avoid regulatory issues, probably regulatory is a bad term to use here, maybe a better term would be avoidance of improper practices in the hospital scenario. A lot of the people we have that use radiation are coming in as either completing a registry or certification or some type of credentialing process that they have met a certain standard of training. But the individual hospitals themselves probably have practices and policies and procedures pertaining to radiation safety that need to be communicated to these individuals. An example, right off the bat comes to mind would be, pertaining to radiation badges or radiation monitors.

We'll talk a little bit more about that in detail later on, but that's an ongoing problem in a hospital environment, is compliance with your monitoring or badging policies and procedures. Of course, when do we provide this training regarding radiation safety to the various groups? Well, obviously when they first come in, if they have not had any background or met a certain standard of training regarding radiation safety, you want to be sure that they get a certain set of basic information so that they can perform their duties in a proper and safe manner. Usually these are areas where they are not occupational workers, your environmental service, security, shipping and receiving, those types of individuals who may be coming into a situation where they've had no experience and yet maybe responsible for handling or being involved with ionizing radiation. In our program, really focus radiation safety training is on an annual basis. Our resources from radiation safety personnel standpoint are somewhat limited and we find that

on an annual basis, being sure that radiation safety training has been provided, that the basics have been addressed, but we also find it very advantageous from that standpoint of providing information as to changes that have occurred in the program, wither due to regulations, changes in the implementation of hospital policies and procedures that pertain to radiation safety, and also areas of concern that have gone through the course of audits or reviews or issues that have come to light to the radiation safety office provide us with the opportunity to address specific areas of concern.

Now one of the different types of groups that we address in our radiation safety program regarding the use of radioactive materials, the technologists in Nuclear Medicine, Radiation/Oncology, the users in those areas obviously are a group that needs to be addressed. An area where we're seeing increasing radiation exposure, above 100mg on an annual basis, is in our cardiac stress areas, because a large number of studies that are done there, you have full-time nurses and Electrophysiology Technicians that are there on a continual basis and need to be instructed as radiation workers even though in the course of their training experience these are very knowledgeable personnel, they understand scientific concepts very well, yet in the course of their training and experience have not been involved with the use unsealed radioactive sources. Another area for radioactive material workers that we address in our, what I call Written Directive program, being an NRC State, we had gotten away from the term Quality Management as soon as we could, because we really feel it doesn't reflect a quality management. Basically what it is is a written directive assurance program and that's what we call, what we may still refer to as QMP programs. These are high risk areas because they involve the use of unsealed radiopharmaceutical therapies, radioactive iodine 131 for various thyroid therapies, I31 and/or Strontium for monoclonal antibodies. Strontium 89 and Samarium 153 for palliative treatment of bone metastasies, so these are high risk areas. At our facility we have our Radiation/Oncology group very intimately involved in doing some of these radiopharmaceutical therapies which is probably not the norm in a lot of facilities, but investigating this I find that it's not that small of a percentage of facilities where these individuals may be involved with radiopharmaceutical therapies.

Obviously the HDR machines are an area of high risk and focus by regulatory agencies and so a training program needs to address that. Brachytherapy, the intravascular brachytherapy, Strontium 90 sources are pretty much weaning, I think the use of these devices are being pretty much replaced by the non-radioactive therapies that are available, but still temporary and permanent implants are an ongoing and active use of sealed sources in Radiation/Oncology and so radiation safety training needs to address those applications, especially for hospitalized patients. The other category where our Written Directive program address what I'll call the Hybrid area, we are looking into the CERA spheres applications, gliocytes and CERA spheres are classified as sealed sources or medical devices, but from a radiation safety standpoint, in terms of concern and training, I kind of call it a hybrid because the safety issues really are all those that address unsealed sources and so from a training standpoint we're looking at and implementing practices and procedures from the standpoint of unsealed sources. Now for the group dealing with radiation machines, the technologists or therapists, diagnostic radiology x-ray machines, the linear accelerators and radiation therapy and the users in those areas, Radiologist, Radiation/Oncologist Interventional Radiology is not uncommon to have nurses that are part of the interventional radiology or cardiology teams that are working at the table side on a routine basis. A group that, again, comes in, not being technologists, diagnostic technologists or radiation workers as a part of their background, and yet have to routinely use or be involved with

diagnostic radiology exposure. Your cardiac cath labs, with the use of C-arm fluoroscopy, surgery is becoming a very increasing area where diagnostic x-ray machines are used, again C-arm fluoroscopy, pain management is becoming almost a part of the fundamental practice in treatment of anesthesiology by Anesthesiologists in dealing with pain management in a surgical environment. Your Orthopedic Surgeons, your Neurosurgeons are increasingly relying on the use of the C-arm fluoroscopy machines in certain procedures, and some of these can be very, very lengthy.

So your surgical areas also, again, your nursing staff that address those circulators and the surgical techs that might be involved in the room exposure. To a lower extent, I should say, or not quite as much in surgery, but in Gastroenterology, in the performance of endoscopies, fluoroscopy is sometimes used. Pulmonists use C-arm fluoroscopy in bronchoscopies and Urologists in the performance of cystographies use C-arm fluoroscopy so it's another group where hospital training needs to be provided. I also pointed out; Keith Strauss is going to get into more of the credentialing training for those areas. Is there support staff? This is probably an area that gets under address in hospital environments where radiation safety training is needed. And these are just some of the groups that we have identified that we perform radiation safety training to some extent, nurses either on the floor have a concern in dealing with diagnostic nuclear medicine patients that come on the floor or portable machines that have to go bedside and so what concerns in radiation safety practices they need to be aware of. Environmental services, by this group I'm lumping your housekeepers, your maintenance, your engineering staff that are running all around the hospital and seem to feel that all the signage and postings apply to everybody but them. Principally, in use of radioactive materials, where this group receives training, but one thing that we started to do at our facility is because some of these groups that MRI machines are, because they are operated by Radiology are radiation machines, not in the true sense from ionizing radiation, of course, but what we started with out environmental services and security personnel is to include some small pieces about MRI safety, especially with security personnel because they tend to be first responders in emergencies and one of the things you don't want, some security officer running in to an MRI machine with a holstered weapon or handcuffs or something of that nature, and so we try to emphasize this training by giving actual examples of events where very untoward circumstances have occurred with security officers going into MRI machines without properly being scanned and removal of ferromagnetic material.

Security is very important in service training when it comes to the security of radioactive materials, we'll talk a little bit more about that in a future slide, but this is a group that is very, very critical that I have found in terms of maintaining security with limited resources, especially when you have high activity sources. Another group that needs to be addressed regarding inservice training are your shipping and receiving personnel, now these tend to be open only during routine clinical hours, but you also need to address the receipt of radioactive packages in off hours. We get nuclear medicine generators on early morning hour deliveries, usually before 5 A.M. on a Sunday morning, so how those packages are delivered and the training of those individuals who provide the transport of those radioactive materials during that time period needs to be addressed and documented. An area where recently we've had to address radiation safety training has to do with our pathology personnel regarding sentinel lymph node studies and handling pathology samples that are transferred from the Operating Room down to pathology for analysis, and in the Emergency Room. You have x-ray machines that are either, we have a very large emergency room, it's one of the primary Emergency Rooms in Ann Arbor so we have fixed

equipment as well as there are situations where patients come in, have an emergency diagnosis, need an emergency nuclear medicine procedure and there very well are situations where we need to perform injections of diagnostic radioactive materials in the Emergency Room before the patient can, because there is a wait period, before the patient can be transferred up to Nuclear Medicine. So there's obviously a concern by the personnel down there about what practices and procedures are appropriate. And I think another group that is very much ignored in terms of radiation safety training is management. Very often the personnel coming in to administrate these areas where support staff in Radiology and Nuclear Medicine, Radiation/Oncology may not have the technical background of the equipment and services that they're managing. They come from business backgrounds, they come from nursing backgrounds that do not have again, that technical expertise, and they need to understand what their obligations and responsibilities are to enforcement and monitoring the radiation safety program. My experiences, I found that a manager who takes radiation safety training and management of the radiation safety program very seriously can be a godsend to a radiation safety officer with limited resources.

An example I'll give right off the bat is in our Cardiac Cath Lab, we have had a lot of issues regarding compliance with practices and policies and a nurse manager came into that administrative position and actually took this very, very seriously, sat down with her, went over the policies and procedures in that specific area, the issues of concern that were raised and set up a very good communication dialogue with that individual both back and forth and I made it real clear that I would be a resource for her with these issues but she's the day-to-day manager and that I needed somebody there that really can monitor that these things are being done properly. So what are some of the, in terms of content of training from a general standpoint? Because of limited time that you have to provide these training programs, there's a lot of competition for training of hospital workers, especially as you get up in to the areas where the responsibilities in occupational workers that you are monitoring on a routine basis. HIPPA is a recent one that hospital workers are having to spend a lot of focus on regarding patient identity security, infection control, just the nature of their non-radiological practices that they may provide regarding equipment, life support, so forth, that they need to have on-going training and experience CPR, this has to be repeated on an annual basis. So there is a lot of competition for time for these individuals for their training to get done. So it is very important that the program be focused and commensurate with the duties. Something that is aimed at housekeeping staff can be very limited, very potent, very focused, it can be done in a matter of a few minutes where as maybe annuary fresher course for your diagnostic x-ray techs, maybe something that obviously has to be something much longer. In our situation, we use the training programs to supplement the training that individuals might get as a result of either a registry or licensing or certification or some type of credentialing that they come in to the hospital. I think going over time, distance and shielding principles with somebody who is a Registered X-ray Tech or Certified Nuclear Medicine Tech is really not the best use of time that you have with these individuals. Some of the difficulties in putting together these programs is, again, the wide range of individuals that you have to address.

You may have individuals that have language problems, may not have a high school diploma up to Cardiologists in addressing practices of minimizing exposure to patients. So, the variation on the level of content provides a lot of challenges in putting together course work and information because there are some fundamentals that you can address with these groups obviously that are not going to change whether you're X-ray, Nuclear Medicine, or excuse me, Diagnostic Radiology, or surgical, in an OP environment, Cardiac Cath Lab or x-ray machines

down in the Emergency Room. But what their levels of concern may be can vary quite a bit. Attendance is a problem as I mentioned earlier that, about full-time employees. We see very commonly in a hospital environment, you have individuals that are working different shifts. We have a situation at our facility where we actually have a 24 nuclear medicine operation. So you have multiple shifts being addressed, you have also workers that may only work on a part-time basis during the week, some that may only work weekends, you may have contingence very, very infrequently, that you want to incorporate into the program because you want to be sure that everyone is address. But I will be perfectly honest with you, if you expect that radiation safety training programs address 100 percent of the people every year, it's not a realistic assumption that you come in with, okay?

That should be the goal and is a goal that we strive for, but in very, very large hospitals it is sometimes not a practical thing that can be achieved. We require that the documentation be maintained with the specific groups that are being managed. What we found that when trying to keep all the radiation safety records regarding training with just the radiation safety office, that very often these groups are audited or inspected by non-radiological services that want to look at their training records, for example in Pathology there is the CAP Committee on Accreditation on Pathology or something like that, that comes in and wants to look at their records and we may not be aware that this audit or review is going on. Also, hospitals sometimes may conduct internal audits of a very focused area and will want to look at that training information, so even though we try to maintain it in our radiation safety office we may it very clear that the department that is being trained needs to keep a copy of that information with them. One thing I wanted to point out as Dick pointed out, that the recent new reg documents from the Nuclear Regulatory Commission is specifically 15:56 Volume 9 has a number of model programs and they have a model program for radiation safety training in Appendix J. I am very reluctant to endorsing taking that model verbatim as what your program should include. If you look at that I think when I was first looking at the number of the different subject matters that are addressed I think remote for all workers I think there were like 23 subjects that were addressed and then if you had high risk areas, like in Nuclear Medicine and Radiation/Oncology there are another 14 different subjects that needed to be addressed and I think the practicality of just saying 'You're going to adopt Appendix J' needs to be considered with, I think some concern. I think it provides excellent resource, I think it provides a very good starting point for formulating a training program, but I'm very reluctant to endorse adopting model J verbatim into a radiation safety program. But I think that the important thing is structuring the program commensurate with the duties that are involved.

Now what are some of the specific content areas that we get into in terms of our training program? Well, one of the first things that we give everybody is some instruction referring to background radiation. We use this as a yard stick, or I guess I should say meter stick, to be metrically proper, of relative radiation risk, especially where non-occupational workers are involved and even in some occupational areas with x-ray tech. It provides a real good means by which they can provide, you can provide them information as to how those limits are relative to exposures they may receive as occupational workers, some of the doses that are involved with patients from diagnostic radiology procedures from radiographic, but it gives everybody sort of this feeling as to where the exposure is that they get on a continuing basis even if they never become involved with exposure to ionizing radiation in a hospital environment. So it's something that we provide with all workers. Obviously review of appropriate time shielding, distancing shielding principles, we've mainly focused on distance and shielding. Time is really

something that with many workers they don't have much control over, okay? But using distance and proper shielding applications are very important. A specific example, when we address workers involved with table side fluoroscopy we review the expectation of policies and procedures regarding leaded apparel. In our State the only thing that's required for people performing table side fluoroscopy are lead aprons and the expectation or they also address gloves, but obviously they are contraindicated in the performance of these types of procedures. There's no reference to thyroid shields. So we've adopted as a hospital policy for table side fluoroscopy that it's a requirement that you wear thyroid shields. And this also then makes management aware that if the thyroid shields are needed, these need to be provided in an adequate number so that these individuals have the proper protection. But we go over these kinds of specific things and the expectations that occur with those types of areas.

One area where we focus on are those that all workers, occupation that are monitored as our badging policies and procedures, we briefly review the radiation dose limits for our State which are regarding diagnostic x-ray equipment are somewhat old, but we still have quarterly limits and especially with the table side fluoroscopy workers that there may be a situation if they exceed a quarterly limit we have to file a report which required an investigation and their input and an interview with them. We also inform them as to where they can get reports of their radiation exposures. When I first came to St. Joe's a few years ago they had a number of issues that they've never seen reports, so we made it incumbent on the managers of the area that they had two options on how to provide reports for their workers. One, they could post them in an area and would provide it without personal information on them, or they need to individually instruct them that the report would be maintained in the manager's office, they could at any time contact the manager or the Radiation Safety Office to review that information on an individual basis. But workers need to know that.

Now with radioactive material workers, NRC requires that you on an annual basis give them a report of what their doses are. With diagnostic x-ray workers, which are probably a larger number of workers, that's not the case. We establish as a hospital policy that we would not discriminate between nuclear medicine workers and diagnostic x-ray workers, so everybody gets an annual report from the radiation safety office on an annual basis and that they're free do with that report, if they want to put it in their files, take it home, frame it, make paper airplanes, it's totally up to them, but that they would get that on an annual basis. It's very important that the worker be aware of their responsibilities regarding radiation monitoring, especially with physicians, there seems to be the perception that wearing monitors is an option and when you look at regulations there's not a regulation that says if a badge is provided, especially with Nuclear Medicine, that you have to wear it, okay? It's up to the licensee or the registrant for x-ray machines to provide the enforcement of wearing badges. And so we implemented a policy and also went through medical staff that established that, if you're issued a badge, you have to wear it and if you don't comply with that the hospital has enforcement procedures for violation of hospital safety practices. Many facilities do not have that, alright? And so it makes the worker aware of their responsibilities, but it also gives some enforcement on the hospital side, but it again is a part of the training program, people need to be aware of what those requirements are. An area where all workers regardless of whether they are monitored or not, an issue of concern that arises regarding from female workers are 'What if I become pregnant?' With occupational workers, especially those that are not technologists, are very surprised by the fact when you present the information that just because you're pregnant does not mean that you are precluded from working with radiation.

There is not a policy that says if you're pregnant you can't work with radiation, it's illegal. And so a lot of them need to understand what the hospital policies and practices are relating to that and where restricted activities do occur if they are based on radiation safety considerations for declared pregnancy. Principally in our facility the two areas where we do have restrictions on duties are in Nuclear Medicine involving handling of radioactive iodine therapies and Radiation/Oncology for pregnant techs regarding restricting them from doing on-call treatments in Radiation/Oncology. One area that obviously they all need to understand is that even though we have dose limits and for people that are monitored that we maintain our policies and practices and below radiation dose limits that our over guiding philosophy is the philosophy of keeping exposures as low as reasonably achievable. So even though we may be far below dose limits that if can reasonably keep them as low as possible that is a philosophy and practice in the institution. All workers need to understand they're obligations in reporting or bringing to the attention of management or the Radiation Safety Office noncompliant issues. This extremely important where you have high radioactive sources. We have brachytherapy program, HDR program and we'll be getting a blood irradiator in the next month and so regarding those types of sources it's very important that they understand that these areas have to be, what the security issues are that address these areas, and that reporting an area that they even perceive to be noncompliant will have absolutely no disciplinary action that will result from that. In other words, someone might say, 'Well, you know I'm afraid to bring, because I don't want to cry wolf', okay or 'I don't want to get somebody in trouble'. They need to understand that these are maintained in confidence and that there are no ramifications from them in that aspect. And I think also they need to know who you're going to call when there are issues, alright. They need to understand who are the radiation safety personnel are, how to contact them at all times and how they can bring any issues to the attention of management or the Radiation Safety Office.

Another area that we address regarding posting and signage, obviously these are regulatory requirements, one of the things that we do is, especially with security is inform them on the locations where radioactive sources are located. As part of their inservice training we give them specific, be sure that they have specific room numbers and they understand where these sources and locations are located, exist. Obviously, postings and notices to employees, I think this is a form that all regulatory agencies have for posting worker rights and information but we also supplement that with contact the Radiation Safety Office, where they can go to review regulations and so forth. And it's very important that they understand that the labels and signs that are used for identifying the various areas or sources of radiation and radioactive materials are universal in nature and that these are not just something that the hospital came up with to kind of maybe make you aware of whether you should be in that area or not. Obviously, describing the symbol, the color format of the signs and labels, what they mean, especially with housekeepers and environmental service personnel, that with these posted areas they are not to go into, packages, that if they come across something with any of these labels they are not to handle those until they have their questions specifically addressed and get clearance, so that's an important thing that they need to be made aware of. For specific groups we will address subjects that are specific to their areas of concern that have been brought up in the past or are recurring issues that are not necessarily in regulation.

A good example of this is the management of pregnant patients. Obviously the most common one is in Diagnostic Radiology, but also in Diagnostic Nuclear Medicine. What is the policies and procedures and how these patients are supposed to be managed and what clearances and reviews and consents need to be addressed, reinforcing that it's their obligation to address

the pregnancy status of any patient, a female patient of reproductive capacity. The one area that we address with diagnostic x-ray machine users and workers are ways of maintaining radiation exposures to a minimum in their area, to themselves as well as to patients. We go over some of the dose information that exists, as to what the doses are that they are giving to patients, from routine studies, from radiographic, through CT up through fluoroscopy and so that they have an awareness of how much exposure is being given on a routine basis. We have annual testing done on our x-ray machines as a hospital practice and we basically summarize that information for their respective areas, so that kind of gives them, this isn't something that, you know is not necessarily a national standard but actually what they are delivering from those specific machines on a routine basis. Minimizing radioactive contamination is a focus in those areas around sealed radioactive sources are used for nuclear medicine, nursing that deals with that may be involved in assisting in any extensive procedures and in Pathology. Those are the basic rules which I think almost everybody has posted in their nuclear medicine areas, again that range from not eating and drinking to facing labels to wearing protective clothing and so forth, not wearing open toed shoes, those types of things. But one thing I think that sometimes is not emphasized enough is that in minimizing radioactive contamination, you're not doing anything different than following standard infection control procedures and that if there is radioactive contamination present that even though you might use a different type of an agent for removal of that, that simply you're following the same types of precautions and procedures that you would for dealing with the non-radioactive, infectious agent, and so in other words, wearing gloves, lab coats, washing hands afterwards, these are all standard infection control procedures.

I think some people may call them universal precautions, but my understanding in talking to Infection Control directors the proper terminology now is just Standard Infection Control Precautions. In emphasizing to these groups, especially the non-nuclear medicine technologists that we have equipment in the form of survey meters that can detect radioactive contamination below very hazardous levels and that we can determine whether contamination is present instantaneously, unlike biological contamination, and provide them with some sense of ease that we have the means of doing this very readily and the importance of emphasizing this with nuclear medicine and performing their daily surveys properly and on a routine basis. Another specific, group specific topic that we address is the security of large activity sources. The groups that we emphasize this with are Radiation/Oncology, Nuclear Medicine and security that any practice of propping doors open when these areas are not occupied by trained personnel is inappropriate, that self closers on the doors are there for a purpose and they are not to be defeated, that the security is aware of these areas and what we've instituted as a part of after hour rounds is that they physically just go up to the door and just say 'can I get into it?', okay and that is an expectation in those areas where the HDR, brachytherapy and radiopharmacy locations are. Dealing with hospitalized nuclear medicine and radiopharmaceutical therapy patients, again the inpatient floor or the floor nursing staff where these patients are housed, need to have focus training that deals with maintaining control of access to these areas, minimizing potential contamination, keeping their exposure to a minimum, what the postings on the doors are for, how we release control of that room after the patient has been discharged, all these need to be a part of that radiation safety training.

Environmental services need to understand that when specific patient rooms are posted they're not allowed to go into that without specific approval by the Radiation Safety Office. Radioactive packages are transported, radioactive materials in the hospital occurs in a number of different formats, obviously radioactive packages coming in through the dock via FedEx, UPS or

those specialized couriers so that your shipping and receiving personnel need to receive instruction on the handling, timely delivering of those packages, be sure that these are not just dropped off in a hallway, that they understand that how these are supposed to be secured from the time they're received to the time of delivery. Security in our hospital are responsible for after hours delivery of radioactive packages. We do not allow them to actually transport, but they are responsible for escorting the courier to the drop-off location in Nuclear Medicine and then being sure that the courier then properly leaves the facilities in a timely manner. The Radiation/Oncology, because they have radioactive sources, especially the IVBT sources are transported from Radiation/Oncology up to the Cath Lab need to understand proper transport for those purposes, but very importantly with Nuclear Medicine Technologists do a number of injections in patient rooms or may transport unit dosages from the radiopharmacy location to the Stress Lab for injections into the patient during stress procedures and all requirements on the transport of those in terms of maintaining that exposures are essentially the background levels and their responsibilities in transporting any waste back to the radiopharmacy for disposal. And these are the specific requirements in addressing some of these areas are things that are over and above what might be found in Appendix J or specific procedures that need to be outlined in a somewhat descriptive manner so that things are done in a uniform and proper procure. Another area that we have to address is with unsealed sources is dealing with emergencies.

Now, in standard practice of Nuclear Medicine, the only real emergency potential is with spills. They do occur, they are not necessarily common in Nuclear Medicine but they do occur. Probably the most common area where these might happen are during injections of cardiac stress patients, so it's very important that they understand what the proper procedure is for spills. But also with those services that might be in the area that you are training, even though they may not have the responsibility for cleaning up spills, they need to understand what their duties might be and if the spill were to occur, let's say, outside of a controlled area, the training experience regarding say security or environmental services, a common question you get is 'well, if there's a radioactive spill, are we responsible for cleaning it up?' and our training and experiences 'no', but you may be involved in controlling access to the area while the spill is being cleaned up, while providing assistance in getting maybe cleaning materials or absorbent materials for cleaning up the spill to assist the nuclear medicine personnel in doing that.

We routinely on an annual basis require with the vendor, going over emergency procedures for retracting of sources with HDR machines. We usually do this at the time of source transfer with HDR and on an annual basis with the IVBT vendor on how emergency procedures are for the radiation/oncology personnel and removal of these sources. Just very briefly, an area for emergencies that you might think that disasters involving the Emergency Room would be an area of focus and is becoming an area we're trying to address right now. We have policies and procedures for handling the traffic accident involving radioactive materials where you might have a couple of individuals, but I think obviously the real focus now is because of Homeland Security, how do you deal with tens and dozens of patients that may appear as a result of a perceived or a possible radioactive dispersal device event, for example in your Emergency Room. And this really is a multi-departmental collaboration, and making people understand the perceptions regarding such emergencies may not be the reality. If you talk to Emergency Room physicians they think a Radiologist or an x-ray tech are well versed in doing radioactive surveys for contamination. So there are even misperceptions within the individual medical groups that have to deal with these types of disasters and of course your security personnel and environmental services that would be involved in such things. So how do we

accomplish the different types of training? Mainly, I've identified here either this training can be provided in written form, audio/visual, increasingly we're seeing availability of information and some programs that are Web based programs both, we don't necessarily have an intra-hospital program that addresses radiation safety, but I've seen some that are very, very slick and envious of some of these programs, but it does show where a lot of hospital training is trying to go. And then of course the knowledgeable presenter, which I'll try to address each of these a little bit as we finish up here, or, in many cases, the most effective way of providing the training is a combination of these. For example, you may have some type of a written format that will address very basic information, but yet to address those areas that are specific to your facility may need to be done via a knowledgeable presenter that has a radiation safety background. In terms of written form, this can be done via a pamphlet, newsletter is another very acceptable format, in discussions with NRC inspectors, they find this a very acceptable means of communicating risk and radiation safety information to personnel. Obviously the subject matter has to be very, very focused in addressing that, but periodic newsletters that address issues of concern are means of providing effective communication on that type of a subject matter. What I just wanted to point out here, we developed a pamphlet in the past year because of a number of issues in compliance with our radiation monitoring program or badge program across the hospital and support areas and so we, actually this a six-sided pamphlet, trifold pamphlet that we developed that addresses the hospital procedures.

One of the things that we put right on the front here and bold letters states; *your responsibility by hospital and radiation safety committee policy is to wear and use it properly*, sort of two by four across the forehead intent is to make them aware that you have an obligation, and every time a new worker gets a badge issued to them they get this pamphlet, so we make it aware to managers that documenting giving this pamphlet is a means of documenting an inservice or training instruction on the care and feeding of the badge and the responsibilities of the wearer. And we go on into things about if their dual badged, types of badging, whether to wear the badge outside the apron and underneath the apron via a color coding system. If it's a single badge, what the dose limits are, addressing pregnancy monitoring, if that comes up in the case of a declared pregnancy, so it's actually been very, very beneficial in providing this type of instruction on a very fundamental requirement with radiation safety programs but tends to be just an absolute pain in the back end in getting compliance and enforcement. And just recently, this policy and procedure from the Radiation Safety Committee went through our medical staff so it became approved by the hospital board as a practice and expected policy and compliance. Another means in terms of written format is the AAPM report 53 I believe it is, which addresses radiation safety training and it's aimed at the hospital personnel that both diagnostic x-ray and nuclear medicine type situations, not necessarily the technologists and user end of it, it doesn't get into that, we'll just say the upper end of training that needs to be provided but is a very good document that I have found for orientation purposes of radiation workers coming into the hospital. And then another one, obviously, is a hospital manual, many hospitals are putting these actually on their hospital information systems, so that they are not killing tens of hundreds of trees every year and every time they have to revise the manual, they are fairly lengthy documents addressing a number of policies and practices that this gets done in an efficient manner and environmentally practical. Audio/Visual, again, these are very good, but they're very prescriptive, they're very fixed in terms of the formats that they can provide. I have up here just a couple of examples of some cd's that, and this is not meant to be a commercial advertisement, but I've found that it's a very, the Landau here is aimed at very introductory orientation purposes

for all hospital workers type format. I think it's about 30, 40 minutes long, has a means of providing testing and so forth.

Another one that I became aware of, again I'm not going to, Keith Strauss is going to get into this a little bit more, I actually became aware of this, it's from the European Commission on Radiation Protection, this is a cd, but it has a number of different, it's aimed at interventional radiology, but it has a number of different modules, it's a little bit awkward to work through, but you can kind of basically take the modules that you want to use and you can say okay modules say 1-3 are for general workers, 1-5, I can't remember the exact numbers, might be aimed at x-ray techs, okay? And then the full blown program might be operators of C-arm fluoroscopy. As I said, it's a little awkward to work through, the one on your right from Landau is very expensive, this, on the left, from the European Commission was actually the right price range for physicists, which is free. But again, these types of things need to be addressed and somewhat tailored and supplemented with your specific program. Videotape, these are three groups that provide videotapes and cd's on radiation safety training. The Radiological Technology Services are videotapes, they are somewhat old, basically from the mid 80's, early 90's, but they address general radiation protection. There's another one on dealing with pregnant workers, general nuclear medicine radiation safety, and then there's another one that focused just on radiation risks, one from the University of Alabama at Birmingham, I've not seen but in talking to a number of people like it very much for orientating workers that are involved with unsealed radioactive sources.

This one from Medfilms are very brief, I think less than fifteen minutes, one aimed at just general radiation safety non-occupational worker type situation and another one that's actually focused, again very brief at environmental workers. So, all these obviously would have to be supplemented by the specific facility in using these in terms of the radiation safety training program. These are some Web based sites that I found with radiation safety training and the intent that I wanted was just kind of to show the gamut of training that's out there on the Web. I need to definitely preface this, I guess I should have a disclaimer here, that you can actually do these training modules that are up here. Now I don't know that there's anything relating to, what's the proper term, legal ramifications? Some of these are obviously not because one of them is a government one, but just to kind of show you the range and gamut of Web based programs that are coming out. One right here in Kansas City from St. Luke's has a very nice module on fluorosal safety, the one from the University of Penn was aimed at nursing staff and environmental workers and general hospital workers and you could actually go through these, they have means of documenting them, but it kind of gives you, if you want to develop programs an idea of what can be done without reinventing the wheel. The one on hazardous material shipping is a Department of Transportation site, I think there are nine modules, you can actually download the PowerPoint presentation and the manuals that go with this, so if you have a someone elaborate shipping and receiving program or if you are the person that's responsible for doing that, like in my case for overseeing this and the Nuclear Medicine technologists, it provides a program that can be actually sort of cut and paste it, if you will, on what needs to be addressed in documenting the shipping and receiving of radioactive packages. Another one I found that addressed a general diagnostic radiology safety was at the Holland East Yorkshire Hospital in England and at this website was a PowerPoint based presentation with questions that you had to answer at the end that was I thought very interesting, entertaining presentation on radiation safety training for diagnostic x-ray workers. But the point is to kind of show here the availability on the Web of training information that is available for hospital training programs.

And then the one that we still use quite a bit is what I'll call is, 'the knowledgeable presenter'. Now, I don't know if you can read this little cartoon up here, but it says "Look at that, I believe it's an online, real time, old time instructor." And so, in presentation I have found that presentations given by someone from the radiation safety staff have been received extremely positively by hospital workers and that's from covering from all ranges because of the fact that it provides a means for immediate availability of radiation safety information. They find it very, the interactive process very positive. People will ask questions in a group that someone may not even thought to and yet was something of concern to them. So it provides that type of interactive process that videotapes and cd's don't necessarily are capable of providing. One that comes up every now and then, that just sometimes shocks me is people who are occupational workers ask me 'well, how does my badge tell me that I've received too much radiation?' the expectation is that it is either going to beep or blink or self destruct or talk to them in some manner or telling them that, you know, you've got problems.

So it provides that type of interactive process and I think most importantly, from the standpoint of radiation safety personnel it makes them realize that there's a real person out there that is actually monitoring the program, it provides them with a face to affiliate with, some of them aren't so pretty faces but, like myself, but they have the ability that if they see this person in the hallway, it's not uncommon to get stopped by a nurse or somebody from environmental services and saying 'hey, you know, this came up, is this something of an issue?' and provides them with the availability of that resource on a real time basis. And I think, I'll stop there and leave it open for any questions. >>

Ralph, Dave Bauer, Pennsylvania, very good presentation. I, having started my career almost thirty years ago in a medical center is sort of a walk down memory lane. A couple of quick points, and I'm going to have to ask John Winston, who I thought was here, he just disappeared. In Pennsylvania we just addressed where the responsibility issue in our regs I believe last year this came up in our advisory committee, and I think we have a regulatory hook now rather than going through the restristar and a licensee we can direct NOV's to the user, the employer in the institution, so that is maybe something to look at. >>

I applaud you for that and I wish that it was the norm. >>

The other point is just a quick point, last week at the National Rep Conference in Pennsylvania we just want to make everybody aware the CDC watch the Federal Register, there's going to be monies coming forward from CDC for Homeland Security training in the radiological area, very specific for radiological area, however, it's going to be going through the State Health Department, so if you're like us at DEP we're working with our Health Department, we're very concerned about getting the hospital staff trained, you look at the going on in Brazil, the walking wealth, the worried the wealth and an RED scenario, so I'd encourage all the States to watch the Federal Register and go after that money. Thanks. >>

Thank you. >>

Good morning, Ralph, I'm Dan Hill with the West Virginia Radiological Health, just wanted to ask you if your hospital is within the 50 mile radius of DC Cook and if so has the utility contacted you for fumigated exercises for disaster training? >>

The answer is no, but we are within 50 miles of Enrich Ferme Power Plant in Monroe, I personally am within five miles and no they haven't. Where we're located actually there are a number of other facilities in terms of hospital facilities, I'd probably say almost a dozen or so and plus they I think have, if memory serves me correctly have arrangements with the hospitals in the immediate area and I think Toledo, if I'm not mistaken. >>

Also, you mentioned the variety of different training methods, this question has to do with documentation and your impression, advantages or disadvantages to reach all three shifts with the Web base training or other handouts, newsletters, pamphlets and how do coordinate the documentation for that? >>

The documentation if they have received it? >>

Yes. >>

Mainly what we require, obviously is a sign-in log and then with that log, in case of a presentation to a group, that log would include an attachment that has an outline of the information that was presented, who gave it and of course the time and when that was done. With Web base, the hospital has a means, we have some things for very general training, background information type training and they have a means for documenting that by, the employee has to enter their personal ID number, so there's a means of melting that together. >>

Hi Ralph, Jill Lipoti, New Jersey, to follow on with that question, documentation of attendance is one thing, but how do you measure the effectiveness of your training? How do you make sure that the person retains the knowledge and that they modify their behavior appropriately? >>

We're taping this aren't we? To be perfectly honest, I had specifically thought about that and presenting it and had intentionally avoided that. I think the real answer to this is the proof is in the pudding. I think you can have people sitting there, they can take a test, you can have physicians who are extremely knowledgeable and understand the concepts and principles and they can take either a Web based program or whatever, but I think the real proof is in the actual performance of the program and the fact that these individuals actually implement that on a day-to-day basis. So I think it's very important that a follow-up part of the training is some type of an audit mechanism within the hospital of reviewing these individuals, obviously radiation badge reports provide, I think one good piece into that pie of audit and review, some of you have a table side Cardiologist who does a fair number of studies and routinely gets nothing to his collar badge, I think there is obviously an area of concern that needs follow-up on, or unless they know something about radiation protection none of us have found yet. So I think there has to be that piece of the pie, so I think that's the real issue is the implementation and the performance by the individuals. One more question. >>

Good morning, Debbie Gilley of Florida. I was curious in the list of types of professions that you listed that I didn't see authorized users or medical physicists listed. Could you describe the training your institution provides or requires for authorized users and medical physicists. >>

Well in terms of the hospital training, obviously they have to meet the training and experience requirements to become an authorized user, required by the Nuclear Regulatory Commission and recentness of training correlary to that. They are also responsible for like the emergency procedures and we go through those. The authorized users are part of that training and experience training program when we require the authorized users in Nuclear Medicine to participate in the annuary refresher course, now I would be remiss in being straight forward with in saying that there are on occasion when patient situation, or patient work requires them sometimes not to be there, but I also tend to, there's not a lot of Nuclear Medicine doc's so I do have the opportunity to make the effort to sit down with them to go over areas of concern in the department as the authorized user so that they're aware that as the authorized, the ultimate responsibility of management here in terms of radiation safety does lie with them. A lot of them think because they look at, I think many times radiation safety as being an advocacy of

responsibility not a delegation in Nuclear Medicine and one of the things that I continually try to work with them is reinforcing that with them. Thank you.