



C. Gordon, RI

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MEMORANDUM FOR: Richard L. Bangart, Director
Office of State Programs

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FROM: Charles E. Norelius, Special Assistant
for Material Safety
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SUBJECT: ASSESSMENT OF NPI AND MARYLAND PROGRAMS

An NRC assisted, State of Maryland inspection of Neutron Products Incorporated (NPI), conducted during October and November 1993, did not disclose any immediate health and safety issues, but did show several problems with the licensee's radiation safety program, which require additional review by the State and by the NRC. The problems at NPI arise from a unique operation and an adversarial management attitude. The State has been effective in improving safety at the site, but has not been successful in addressing all radiation safety issues. State/licensee communications are poor and may detract from problem resolution. NRC direct oversight or increased involvement in the State's oversight of NPI is warranted to reach a full understanding of the safety significance of the licensee's complete operations, and to resolve longstanding issues.

Background

On September 27, 1993, the EDO informed the Commission of plans for the NRC staff to provide assistance to the State of Maryland to effect safety improvements at NPI. Among the areas identified for assistance were evaluation of waste storage and disposal, methods to minimize controlled and uncontrolled releases of Co-60, analysis of ALARA practices, and characterization of the off-site contamination pathways.

To prepare for this assistance, a meeting was held with Maryland Department of the Environment personnel in Baltimore on September 28, 1993. I participated, on behalf of the NRC, along with Craig Gordon, RI SAO, R. Bores, RI Section Chief, and Wayne Slawinski, RIII Radiation Specialist. The State was represented by Carl Trump, Program Administrator, Radioactive Material Compliance, and three members of the staff, one of whom (Ray Manley) was designated as the team leader for the State/NRC inspection. At this meeting, the scope of the inspection was determined, as well as the date of the onsite team inspection. Details are described in my memorandum, dated September 29, 1993, to R. Bernero (Enclosure 1).

The onsite inspection was conducted October 18-22, 1993. The inspection focussed on the issue of potential release paths from the facility, primarily as a result of source manufacturing operations in the hot cell. The NPI program is quite extensive with a Co-60 sealed source manufacturing program,

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two large product irradiators, and a chemical manufacturing operation. Because of time constraints for the inspection and the scope of the NPI program, the inspection did not provide a comprehensive review of the total NPI program or of the State oversight of NPI. However, we did gain important insights into significant areas of the program. In addition to the onsite inspection, an aerial overflight was performed during November 1-12, 1993, by EG&G, under an NRC contract, to evaluate offsite contamination.

Inspection Findings

The inspection determined that the hot cell and surrounding Limited Access Area (LAA) was relatively clean, with external radiation levels in the hot cell of about 300 mR/hr and contamination in the LAA from 500-1000 dpm/100 sq. cm. These levels have improved over time, according to the State, and may have been exceptionally good given the announced nature of this inspection. Smoke tests to demonstrate air movement showed a negative pressure only at the rear entrance of the hot cell and at a pass-through box from the office area to the LAA. In other areas of the LAA the air appeared to be stagnant allowing contamination to drift, or in the case where the overhead doors are open to the outside, which occurs regularly, allowing wind to move contamination. The air filtration system from the Hot Cell was in good working order. The licensee's program for analysis of airborne effluents from the LAA through the ventilation system was adequate, and showed releases to be low.

Liquid effluents from the process area are collected and pumped into a truck at least weekly, and transported to the sanitary sewer system. The licensee collects three samples from each truckload. All samples are counted in a high background area. As a result the LLD is relatively high, but well within regulatory limits. The licensee documents any positive reading, uses the highest reading of the three samples as being representative of the whole, and then adds the three sigma value as the basis for calculating the quantity released. Based on this conservative approach, records show releases of less than 250 mCi total since January 1985. Independent surveys of the truck and the release point at the sanitary sewer system showed nothing unusual except for 1.5 mR/hr reading at one point on the surface of the truck. This level remained after the truck was unloaded, and apparently resulted from a procedural violation allowing buildup on the inner baffles because of inadequate cleaning of the truck over an extended period of time. This also raises a question of the dispersability and solubility of the material. Given the relatively low quantities of material discarded and the conservative approach in documenting these releases, this aspect of the program does not appear to present any undue safety problem. However, implementation of the new Part 20 will require a determination of the solubility of the material to determine its releasability. The water in the sanitary sewer system is processed at the Blue Plains treatment plant, where the sludge is composted with wood chips and sold to the public for gardening and landscaping. Samples of sludge at the Blue Plains treatment plant showed only commonly used medical isotopes, with no indication of cobalt 60.

Problems still exist at the facility, however. Waste storage presents the greatest potential safety problem. Dry waste is stored in a garage-like structure which is part of the building complex, accessed by overhead doors which lead to an open courtyard. About 50-60 plastic bags, along with the steel drums and HICs, which together contain about (b)(2)High of cobalt 60 as waste materials, are likely the primary contributors to the renceline doses which, according to the State, continue to exceed the 500 mR/yr license limit for unrestricted areas, at several locations. Some of the plastic bags are ripped, and are likely significant contributors to the extensive contamination in the courtyard area since the overhead doors to that area must be open for any work activity in the storage area. A fire protection analysis showed that the likelihood of a fire being initiated in this area is low, but if one should start, the fire load in the area is moderate and the amount of material which could be released could present an offsite hazard. The licensee agrees that waste storage is a problem area, and contends that it has proposed a fix, but that the State will not act on the proposal. The NPI President states that the State does not have competent people to evaluate his proposal. The State says there are significant regulatory issues which need to be resolved. There have been mixed directions from the State to NPI regarding the shipment of waste off site because of its potential impact on Maryland's status in the waste compact. Excessive shipments would make them a candidate for becoming a host state for a waste disposal site.

Another area of concern (although not a substantial safety problem) relates to the release from the site of small quantities of cobalt 60 through pathways which are not being controlled. Off site surveys during the inspection identified six spots of contamination ranging up to 0.6 microcuries, downwind from the site in the adjacent neighbor's field. This is typical of prior surveys by the licensee and the State which have identified contamination around the facility, primarily in the prevailing downwind direction. Identified spots of contamination are always cleaned up, but subsequent surveys show similar results. The team concluded that the most likely source of the contamination is windblown material from the contaminated courtyard and adjacent work and storage areas or from the dry pond area.

Soil samples taken in the unrestricted drainage area of the dry pond and other areas surrounding the plant, all showed identifiable Co-60 with the highest level of 410 pCi/gm found on railroad property near the site. These levels violate the Maryland license condition which limits contamination in unrestricted areas to 8 pCi/gm, and demonstrate poor health physics practices. The State believes the licensee remains in violation of the requirements for not monitoring the level of material released in liquids through the dry pond, and I endorsed this conclusion during the exit meeting. The licensee greatly objects to this conclusion.

The licensee claims it takes sufficient storm sewer water samples, which when combined with their analysis of a "rock bed filter" and of the material in the dry pond area show that releases are much less than 1% of MPC values for effluent releases to unrestricted areas. They also object to a license condition imposed on them which limits the offsite contamination to 8 pCi/gm

on the basis that there is no technical basis for the level, and that it was illegally imposed by the State. The NPI President also questions the State's technical competence to evaluate his program for monitoring releases. A water sample taken from an onsite monitoring well showed no activity above background. The inspection did not address the appropriateness of the well location and depth relative to the geology of the area.

The aerial overflight could not distinguish any contamination within a 1000 foot radius from the plant due to the high radiation levels emanating from the plant itself. However, outside of that area, no contamination was identified. The overflight included the area where the waste water is dumped into the sanitary sewer system.

The team also expressed concern over the minimal amount of time spent by the licensee on radiation safety matters, and the apparent lack of plant health physics knowledge by the Radiation Safety Officer. It did not appear that the licensee was very knowledgeable regarding the use of their contamination detection system relative to evaluation of intakes of radioactive material. The licensee described its efforts to hire a health physicist, and contended they cannot get anyone to come because of the bad reputation they have received because of the State lawsuit against them. The team also noticed some poor health physics practices by workers--the violation of step-off pads and workers with PCs unzipped in the front while working in the LAA.

I assembled the input to the inspection report from the NRC inspectors and provided a copy to the State of Maryland on November 23, 1993. A copy is enclosed for your information (Enclosure 2). The State plans to incorporate this with its own findings and issue a single inspection report.

New Part 20

The impact of the new Part 20 was also discussed with the licensee. The licensee agrees it does not meet this new regulation, and would not be able to meet it for several months if it were imposed promptly by the State. In my view, the licensee will have to put forth considerable effort to show it meets the 100 mRem/year TEDE to the nearest resident. The State has measured 87 mR/yr external radiation at one neighbor's home already, so considerably more analysis will be required to assess other neighbors and other possible modes of exposure. (Of course, the more desirable course of action would be to eliminate the source of the exposure.) Other areas requiring licensee actions under the new Part 20 relate to the determination of the solubility of material released to the sanitary sewer system, the program for evaluating doses from internal uptakes, and the ALARA program. Exposures to workers and others from the waste area do not appear to be ALARA, although no rigorous assessment of this issue was performed during the inspection.

Exit Interview

The Team exit meeting lasted 4.5 hours. While the State presentation could have been more crisp, I estimate that 80% of this time resulted from comments.

by the NPI President. In addition to the issues discussed above, considerable time (about 1 hour) was devoted to his displeasure with the press release which was issued by the State, especially the aspects dealing with the issues in the courts. He insisted on telling the story of how he had gotten into a lawsuit with the State. He considers it a "citizenship" issue since he believes he was threatened and coerced into accepting license conditions which are unwarranted. He says he plans to continue to fight the matter. I told him of NRC's determination that a press release was to be issued regarding the Agency's assistance to Maryland on the inspection. When pressed, he could not identify any errors with the press release.

NPI-State Antagonism

The NPI President is openly antagonistic with the State, questioning their technical competence and arguing with most of their statements, especially those related to waste disposal or offsite contamination. The State did not express the same degree of open hostility, but in private conversations, it is obvious that the ongoing battles with the licensee have left their mark. Such an atmosphere makes objectivity hard to maintain, and likely makes problem resolution more difficult.

Implications regarding the Maryland Program

Based on the scope of this inspection and on discussions with State personnel, there are several conclusions that I believe can be drawn from this exercise.

1. The State appears to have been effective in reducing the doses to workers within the plant. The hot cell and LAA were relatively clean. Doses from hot cell cleanup after each melt, the primary cause of personnel exposure, have been reduced by about a factor of three over the last three melts. (Melts occur about once every 12-18 months.) Whether these doses are ALARA was not determined, and it would take a considerable effort to look at this area alone. One would suspect that the exposures from the stored waste are not ALARA.
2. The State appears to have been effective in reducing the spread of contamination from the plant by plant workers. They have required new sensitive monitors for egress from the LAA.
3. The State has not been effective in handling the waste storage problem, the high fence line doses, or the onsite and offsite contamination. This is an observation, but not necessarily an evaluation of the State Program. Admittedly, onsite waste storage and contamination are difficult areas with unclear regulations. However, it is not clear why stronger action has not been taken by the State to reduce fence line doses even in the absence of a solution to the waste storage problem.

There is no lack of factual information on what exists at the site, but there are questions that remain related to NPI/State interface, licensee recalcitrance, clarity of requirements and the effectiveness of enforcement actions by the State.

4. This licensee is unique in terms of its operation and the large quantities of cobalt-60 which it handles. This inspection was directed toward the hot cell operations considered to be the most likely source of exposure and contamination. It did not address the two large irradiators, nor the contaminated equipment or other singly encapsulated material that is stored in the pool. Also, the licensee has a chemical processing business in the same building. A hazards analysis of this process relative to the use of licensed material would seem prudent, similar to recent NRC actions for some of its licensees.
5. It is not clear that the State has a well defined strategy for addressing the multiple concerns at NPI. While the State inspectors spend a lot of time conducting inspections, some violations appear to be ongoing without resolution. The judge's summary decision in favor of the State on the majority of issues which are in contention with NPI, and the upcoming trial to decide the remaining issues, will clarify the correctness of the violations. However, upon completion of that process, it is not clear that a plan exists for the implementation of those decisions, with due consideration for the safety significance of the issues.

Conclusions and Recommendations

I conclude that there are no immediate health and safety concerns regarding the cobalt-60 manufacturing and hot cell operations. However, there are a number of ongoing issues related to waste storage and disposal, offsite dose rates, and contamination control which need to be followed. Further, the NRC should have a good understanding of other operations which were not reviewed during this team assessment.

Many of the problems which I observed appear to be affected by State/licensee interface. This is obviously a difficult licensee to deal with, but I believe it would be in the best interest of the NRC to determine if the State has clearly and properly responded to the licensee relative to its requests for correction of the waste storage problem, and to the offsite contamination issues, and if so, whether enforcement action has been as vigorous as it should be. Also, a part of this assessment should include whether the safety significance of issues has been properly considered relative to the compliance aspects, in dealing with this licensee.

The uniqueness of this licensee requires that it be given special attention by the State and the NRC. Closer oversight and increased technical assistance are warranted. An early detailed and complete file review would provide NRC and the State with a baseline assessment to use for determination of the best

long term strategy. There are two primary ways the NRC could provide increased oversight and involvement. These are:

1. Institute a special program related to NPI above and beyond the normal Agreement State review by maintaining ongoing oversight and participation with the State on all licensing, inspection (including routine accompaniment), and enforcement actions related to NPI.
2. Reassert regulatory authority over this particular licensee.

The best course of action would have to be based on a consideration of the most effective use of resources by the State and NRC, the relative technical qualifications of the State and NRC staffs, and the best way to bring these to bear on the unique problems represented by NPI, and the legal basis for reasserting authority over this single licensee by the NRC.

Please let me know if you wish to discuss this matter further.

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Enclosures:

1. Memo dtd 9/29/93 fm
CNorelius to RBernero
2. NRC Input to Inspection Report

cc w/encls:

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