2

06-08-06P12:50 RCVD

September 6, 2006
By Certified Priority Mail

Letter of Transmission

SEC Petition
Office of Compensation Analysis and Support
NIOSH
4676 Columbia Parkway
MS-C-47
Cincinnati, OH 45226

This letter transmits an SEC petition to which

An additional personal commentary transmits information not in or not usually referenced in the published literature, including information gathered by the writer while Chief, Field Services, NAPCA, USPHS in the late 60's. While engaged in an air pollution control program probe in the southwest [redacted] Amarillo at the request of area unions. The leadership of these unions, based on urgent requests from local members, wished to activate the Amarillo metropolitan statistical area as an air quality control region. The area was small relative to other candidates in the state, but it was also afflicted with significant point sources of particulates and sulfur oxides. From the perspective of the unions, while it was an educational and cathartic service, the visits, with peer group leaders, most of whom were employees or wives of employees of Pantex, were not fruitful. Pertinent to the issue at hand, the visits resulted in the transmission of critical information to our sister agency, then transforming to NIOSH. The primary concerns were not those associated with the ambient environment, but with the work environment.

The particulates of greatest concern were asbestos and metals, especially beryllium. The agent of greatest concern, however, was ionizing radiation. High levels of anxiety were generated by a lack of environmental [area and personal] and medical monitoring and the absence of personal exposure records. Management and governmental assurances of no-effect exposures were companions to slack controls and minimal safe-practice training. Liaison with the local medical community and integration of the environmental factor into healthcare and wellness programs did not exist. Even if a family physician was

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curious about workplace exposures, plant management seldom transmitted information of value to the examining provider. Thus personal medical records are incomplete.

Reference was made to subcontractor, temporary, probationary and short-term employees who when exposed to high levels of radiation were, in the words of one participant, "flushed". To this day, they are not fully represented in the records or in any study of this and sister populations. In any one cell of high exposure, there typically had been at least one permanent employee.

It is important to keep in mind that in the early days of nuclear weapons production, fabrication at Pantex was conducted under wartime conditions that have been moderated, but not eliminated, over time. To some extent, this explains cavalier work procedures, personnel policies insensitive to levels or duration of exposure, and unacceptable materials handling uniformly found. Complaint was and is perceived as unpatriotic, and largely unvoiced for a myriad of reasons. It is also true that the improvements for many have been too late, and too little for many exposed to radiation, beryllium and other agents still to be adequately studied.

About two decades later, at a meeting on occupational health in Amarillo of councils of nuclear workers from throughout the DOE system convened by the President of Metal Trades Department, AFL-CIO, including a vocal delegation from Pantex, the essential perceptions of the workers had significantly changed. The latency periods had run their course; cases of disease reasonably attributable to the work environment had appeared among them. Higher levels of anxiety and anger had overcome the natural reticence of the patriot -worker to complain, peer pressures had changed, and the stoic hesitancy to express personal pain endemically characteristic of their culture was pierced. Information on conditions and standard practices of the past and present became more specific, and expressed more strongly in the discussion of specific cases of disease reasonably attributed to their work that appeared among them. Our worst fears were realized. My notes are clear: there was high concern over the absence of adequate personal medical and exposure records. The DOE workers compensation legislation originated in that meeting.

Sharing this significant chain of human events, the current comprehensive study by Marsh and Esmen of brain cancers among Pratt-Whitney workers, with many exposures similar to those found in the DOE system, began with a report by CJ Johnson, a county health officer in Colorado. Dr. Johnson reported from county records 12 cases [mostly glioblastomas] in a population of 3985 Rocky Flats plutonium workers, at the 1980 annual meeting of the American Public Health Association.[2] In response to that and other outbreaks, the Director of NIOSH, called a national meeting.[3] The urgency was justified, but no substantive remedial action resulted, John Peters' paper at the conference, for example,

[2] Johnson CJ. Letter to the Editor, AmJEp 127,6:1321-1322 1988.
[3] See IJ Selikoff and EC Hammond, eds. 'Brain Tumors in the Chemical Industry'. Annals NYAS 1982.

noted an outbreak in the aerospace industry, but there was no follow up! The cancers were a sentinel disease, not in the conventional medical sense, but as a disease of organization. The Colorado cases surfaced through a vigilant county health officer, not through any program of an employer or the federal or state governments. The Pratt-Whitney study was initiated by the inadvertent meeting of two intelligent widows in a grocery store. To this day, despite recognition of the value of broader, more intense and complete research, not a single serious community study has been conducted in any DOE facility community.

While the lack of definitive records has been recognized, leading to problems of quantification of risk, there has been a persisting failure to recognize the value of clear qualitative assessment. Multiple material and efficient causes of cancer and other diseases, agents for which there are no demonstrable thresholds of effects, indisputably, have been present. Expected effects have been clinically manifested, albeit not quantitatively linked, as reported by individual workers and by ongoing NCI research and DOE medical surveillance programs for the Pantex population. It is reasonable to believe that the 'false negatives' implicit in even the most rigorous epidemiology exist, and that the occupational factor exists in the calculus of etiologic factors in many cancers in the Pantex population.

Given the necessity that effects have causes, the moral imperative here is, at the very least, the granting of this petition.

Respectfully submitted,

F.3 ☐ I/We have attached a report from a health physicist or other individual with expertise in radiation dose reconstruction documenting the limitations of existing DOE or AWE records on radiation exposures at the facility, as relevant to the petition. The report specifies the basis for believing these documented limitations might prevent the completion of dose reconstructions for members of the class under 42 CFR Part 82 and related NIOSH technical implementation guidelines.

(Attach report to the back of the petition form.)

F.4 ☐ I/We have attached a scientific or technical report, issued by a government agency of the Executive Branch of Government or the General Accounting Office, the Nuclear Regulatory Commission, or the Defense Nuclear Facilities Safety Board, or published in a peer-reviewed journal, that identifies dosimetry and related information that are unavailable (due to either a lack of monitoring or the destruction or loss of records) for estimating the radiation doses of employees covered by the petition.

(Attach report to the back of the petition form.)

Go to Part G

G Signature of Person(s) Submitting this Petition — Complete Section G.

All Petitioners should sign and date the petition. A maximum of three persons may sign the petition.

Signature _____ Date 9/6/06

Signature _____ Date 8-22-06

Signature _____ Date 8-3-06

Notice: Any person who knowingly makes any false statement, misrepresentation, concealment of fact or any other act of fraud to obtain compensation as provided under EEOICPA or who knowingly accepts compensation to which that person is not entitled is subject to civil or administrative remedies as well as felony criminal prosecution and may, under appropriate criminal provisions, be punished by a fine or imprisonment or both. I affirm that the information provided on this form is accurate and true.

Send this form to:

SEC Petition
Office of Compensation Analysis and Support
NIOSH
4676 Columbia Parkway, MS-C-47
Cincinnati, OH 45226

If there are additional petitioners, they must complete the Appendix Forms for additional petitioners. The Appendix forms are located at the end of this document.

08-30-06 11:50 RCVD

Name or Social Security Number of First Petitioner: _____

Special Exposure Cohort Petition
under the Energy Employees Occupational Illness Compensation Act

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

OMB Number: 0920-0639 Expires: 05/31/2007

Special Exposure Cohort Petition — Form B

Use of this form and disclosure of Social Security Number are voluntary. Failure to use this form or disclose this number will not result in the denial of any right, benefit, or privilege to which you may be entitled.

General Instructions on Completing this Form *(complete instructions are available in a separate packet)*:

Except for signatures, please **PRINT** all information clearly and neatly on the form.

Please read each of Parts A — G in this form and complete the parts appropriate to you. If there is more than one petitioner, then each petitioner should complete those sections of parts A – C of the form that apply to them. Additional copies of the first two pages of this form are provided at the end of the form for this purpose. A maximum of three petitioners is allowed.

If you need more space to provide additional information, use the continuation page provided at the end of the form and attach the completed continuation page(s) to Form B.

If you have questions about the use of this form, please call the following NIOSH toll-free phone number and request to speak to someone in the Office of Compensation Analysis and Support about an SEC petition: **1-800-356-4674.**

If you are:	☐ A Labor Organization,	Start at D	on Page 3
	☐ An Energy Employee (current or former),	Start at C	on Page 2
	☐ A Survivor (of a former Energy Employee),	Start at B	on Page 2
	☒ [1] A Representative (of a current or former Energy Employee),	Start at A	on Page 1

A Representative Information — Complete Section A if you are authorized by an Employee or Survivor(s) to petition on behalf of a class.

A.1 ***Are you a contact person for an organization?*** ☐ Yes (Go to A.2) ☒ [4][3] No (Go to A.3)

A.2 **Organization Information:**

____
Name of Organization

____
Position of Contact Person

A.3 **Name of Petition Representative:**

____
Mr./Mrs./Ms. First Name Middle Initial Last Name

A.4 **Address:**

____
Street Apt # P.O. Box

____
City State Zip Code

A.5 **Telephone Number:** (____) ____-________

A.6 **Email Address:** ____________________

A.7 ☒ [5] Check the box at left to indicate *you have attached to the back of this form written authorization to* petition by the survivor(s) or employee(s) indicated in Parts B or C of this form. An authorization

If you are representing a Survivor, go to Part B. If you are representing an Employee, go to Part C.

Name or Social Security Number of First Petitioner: ________________________

B Survivor Information — Complete Section B if you are a Survivor or representing a Survivor.

B.1 **Name of Survivor:**

Mr./Mrs./Ms. First Name Middle Initial Last Name

B.2 **Social Security Number of Survivor:** _____

B.3 **Address of Survivor:**

Street Apt # P.O. Box

City State Zip Code

B.4 **Telephone Number of Survivor:** (____) _____

B.5 **Email Address of Survivor:** _____

B.6 **Relationship to Employee:** ☐ Spouse ☐ Son/Daughter ☐ Parent ☐ Grandparent ☐ Grandchild

Go to Part C

C Employee Information — Complete Section C UNLESS you are a labor organization.

C.1 **Name of Employee:**

Mr./Mrs./Ms. First Name Middle Initial Last Name

C.2 **Former Name of Employee** (e.g., maiden name/legal name change/other):

Mr./Mrs./Ms. First Name Middle Initial Last Name

C.3 **Social Security Number of Employee:** _____

C.4 **Address of Employee** (if living):

Street Apt # P.O. Box

City State Zip Code

C.5 **Telephone Number of Employee:** (____) _____

C.6 **Email Address of Employee:** _____

C.7 **Employment Information Related to Petition:**

C.7a Employee Number (if known): _____

C.7b Dates of Employment: Start _____ End _____

C.7c Employer Name: _____

C.7d Work Site Location: _____

_____

C.7e Supervisor's Name: _____

Go to Part E

D Labor Organization Information — Complete Section D ONLY if you are a labor organization.

D.1 Labor Organization Information:

_____
Name of Organization

_____
Position of Contact Person

D.2 Name of Petition Representative:

_____

D.3 Address of Petition Representative:

_____
Street Apt # P.O. Box

_____
City State Zip Code

D.4 Telephone Number of Petition Representative: (____) ____-_____

D.5 Email Address of Petition Representative: _____

D.6 Period during which labor organization represented employees covered by this petition (please attach documentation): Start _____ End _____

D.7 Identity of other labor organizations that may represent or have represented this class of employees (if known):

_____

Go to Part E

E Proposed Definition of Employee Class Covered by Petition — Complete Section E.

E.1 **Name of DOE or AWE Facility:** Pantex Ordnance Plant, (US DOE), Amarillo, TX [1]

E.2 **Locations at the Facility relevant:**

Pantex Plant, (US DOE), Amarillo, TX AEC/DOE facilities including production, transport, storage, test firing and research and development [2]

E.3 **List job titles and/or job duties of employees included in the class. In addition, you can list by name any individuals other than petitioners identified on this form who you believe should be included in this class:**

Production workers, technicians including radiography, guards, physical plant, maintenance, administrative and support staff, contractors and AEC staff [3]

E.4 **Employment Dates relevant to this petition:**

Start January 1, 1950 [4] End December 31, 1991, atomic weapons assembly and disassembly processes [5]

Start _____ End _____

Start _____ End _____

E.5 ***Is the petition based on one or more unmonitored, unrecorded, or inadequately monitored or recorded exposure incidents?:*** ☐ Yes ☐ No

If yes, provide the date(s) of the incident(s) and a complete description (attach additional pages as necessary):

The Pantex Plant was originally constructed as a conventional bomb plant during World War II. In 1951, the AEC purchased the facility for use as a nuclear weapons production facility. In 1965, the Clarksville, TN, atomic bomb modification facility closed; a year later, the Midland, TX, modification facility closed, and in 1975, the nuclear weapons operations at IAAP, Pantex's sister plant at Burlington, IA, were transferred to Pantex. This left Pantex as the only plant in the U.S. for nuclear weapon assembly and disassembly.

Workers report working with fissile materials (pits) without benefit of protective lead aprons and early on without monitoring. Workers report putting large pits on their laps and scooting across the floor to get the pits in the required weight chambers. Reportedly clerks with no protection had pits in unshielded cans sitting in front of their desks for long periods. After lead aprons were issued, workers report the aprons were folded (and thus damaged) and used thereafter.

Some Pantex workers experienced visible, (thermal?), burns when materials dropped into the cuffs of their coveralls and later onto their skin creating permanent, visible scars.

By workers' report the radiation alarm monitoring system has functioned erratically.

The dosimetry program at Pantex, like that of most facilities within the nuclear weapons complex, developed over time and is fraught with the same problems that are documented for other weapons sites: lack of available individual dosimetry records; lack of protocols to validate badge data once begun; technical limitations of early era dosimetry. Most dosimeters have routinely been worn on the lapel of coveralls or shirts at a greater distance from the source tan target organs. As is the case for most facilities records for exposures and releases were apparently not always well documented or maintained. [6]

Go to Part F

F Basis for Proposing that Records and Information are Inadequate for Individual Dose — Complete Section F.

Complete at least one of the following entries in this section by checking the appropriate box and providing the required information related to the selection. You are not required to complete more than one entry.

F.1 ☒ 1 I/We have attached either documents or statements provided by affidavit that indicate that radiation exposures and radiation doses potentially incurred by members of the proposed class, that relate to this petition, were not monitored, either through personal monitoring or through area monitoring.

(Attach documents and/or affidavits to the back of the petition form.)

Describe as completely as possible, to the *extent it might be unclear, how the attached* documentation and/or affidavit(s) indicate that potential radiation exposures were not monitored. 2

Attached are additional data and abstracted reports indicating inadequacy of monitoring and worker protection [illegible] during the earliest years of operation at Pantex. These data and reports come from various sources, including worker histories, exposure monitoring data from the Pantex Plant and the Department of Energy Tiger Team report dated 199[illegible] which identified numerous radiological health and safety deficiencies and resulted in profound changes in staffing and function of the Pantex Plant Environment Health and Safety Department.

F.2 ☐ I/ We have attached either documents or statements provided by affidavit that indicate that radiation monitoring records for members of the proposed class have been lost, falsified, or destroyed; or that there is no information regarding monitoring, source, source term, or process from the site where the employees worked.

(Attach documents and/or affidavits to the back of the petition form.)

Describe as completely as possible, to the extent it might be unclear, how the attached documentation and/or affidavit(s) indicate that radiation monitoring records for members of the proposed class have been lost, altered illegally, or destroyed.

Part F is continued on the following page.

Name or Social Security Number of First Petitioner: ____________________

F.3 ☐ I/We have attached a report from a health physicist or other individual with expertise in radiation dose reconstruction documenting the limitations of existing DOE or AWE records on radiation exposures at the facility, as relevant to the petition. The report specifies the basis for believing these documented limitations might prevent the completion of dose reconstructions for members of the class under 42 CFR Part 82 and related NIOSH technical implementation guidelines.

(Attach report to the back of the petition form.)

F.4 ☐ I/We have attached a scientific or technical report, issued by a government agency of the Executive Branch of Government or the General Accounting Office, the Nuclear Regulatory Commission, or the Defense Nuclear Facilities Safety Board, or published in a peer-reviewed journal, that identifies dosimetry and related information that are unavailable (due to either a lack of monitoring or the destruction or loss of records) for estimating the radiation doses of employees covered by the petition.

(Attach report to the back of the petition form.)

Go to Part G

G Signature of Person(s) Submitting this Petition — Complete Section G.

All Petitioners should sign and date the petition. A maximum of three persons may sign the petition.

_____ _____
Signature Date

_____ _____
Signature Date

_____ _____
Signature Date

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Name or Social Security Number of First Petitioner: _____

Public Burden Statement

Public reporting burden for this collection of information is estimated to average 300 minutes per response, including time for reviewing instructions, gathering the information needed, and completing the form. If you have any comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, send them to CDC Reports Clearance Officer, 1600 Clifton Road, MS-E-11, Atlanta GA, 30333; ATTN:PRA 0920-0639. Do not send the completed petition form to this address. Completed petitions are to be submitted to NIOSH at the address provided in these instructions. *Persons are not required to respond to the information collected on this form unless it displays a currently valid OMB number.*

Privacy Act Advisement

In accordance with the Privacy Act of 1974, as amended (5 U.S.C. § 552a), you are hereby notified of the following:

The Energy Employees Occupational Illness Compensation Program Act (42 U.S.C. §§ 7384-7385) (EEOICPA) authorizes the President to designate additional classes of employees to be included in the Special Exposure Cohort (SEC). EEOICPA authorizes HHS to implement its responsibilities with the assistance of the National Institute for Occupational Safety (NIOSH), an Institute of the Centers for Disease Control and Prevention. Information obtained by NIOSH in connection with petitions for including additional *classes of employees in the SEC will be used to evaluate the petition and report findings to the Advisory* Board on Radiation and Worker Health and HHS.

Records containing identifiable information become part of an existing NIOSH system of records under the Privacy Act, 09-20-147 "Occupational Health Epidemiological Studies and EEOICPA Program Records, HHS/CDC/NIOSH." These records are treated in a confidential manner, unless otherwise compelled by law. Disclosures that NIOSH may need to make for the processing of your petition or other purposes are listed below.

NIOSH may need to disclose personal identifying information to: (a) the Department of Energy, other federal agencies, other government or private entities and to private sector employers to permit these entities to *retrieve records required by NIOSH; (b) identified witnesses as designated by NIOSH so that these* individuals can provide information to assist with the evaluation of SEC petitions; (c) contractors assisting NIOSH; (d) collaborating researchers, under certain limited circumstances to conduct further investigations; (e) Federal, state and local agencies for law enforcement purposes; and (f) a Member of Congress or a Congressional staff member in response to a verified inquiry.

This notice applies to all forms and informational requests that you may receive from NIOSH in connection with the evaluation of an SEC petition.

Use of the NIOSH petition forms (A and B) is voluntary but your provision of information required by these forms is mandatory for the consideration of a petition, as specified under 42 CFR Part 83. Petitions that fail to *provide required information may not be considered by HHS.*

Name or Social Security Number of First Petitioner: _____

From the tables below one can see that the majority of the Pantex was not monitored for radiation exposure.

TABLE 6.1-1. *History of External Radiation Exposures at Pantex Plant*

Year	Total Population Dose (Person-Rem)	Maximum Individual Dose (Rem)	Number Monitored	Number with Zero Dose	Percent of Plant with Zero Dose	Average Population Dose (Rem)
1952	0.000	0.000	1	1	100	0.000
1953	0.000	0.000	1	1	100	0.000
1954	0.000	0.000	2	2	100	0.000
1955	0.000	0.000	1	1	100	0.000
1956	0.000	0.000	1	1	100	0.000
1957	0.020	0.020	3	2	67	0.007

Year	Total Population Dose (Person-Rem)	Maximum Individual Dose (Rem)	Number Monitored	Number with Zero Dose	Percent of Plant with Zero Dose	Average Population Dose (Rem)
1958	0.090	0.049	19	14	74	0.005
1959	0.350	0.075	22	14	64	0.016
1960	10.348	0.848	69	20	29	0.150
1961	8.740	0.831	71	13	18	0.123
1962	5.268	0.342	64	15	23	0.082
1963	18.201	2.654	218	102	47	0.083
1964	79.911	4.410	253	19	8	0.316
1965	47.406	3.690	416	188	45	0.114
1966	70.460	2.750	581	240	41	0.121
1967	78.330	3.330	563	240	43	0.139
1968	29.642	1.200	423	217	51	0.070
1969	30.835	2.850	432	235	54	0.071
1970	85.464	2.787	468	120	26	0.183
1971	101.419	3.560	495	201	41	0.205
1972	70.843	2.950	467	179	38	0.152
1973	86.349	6.550	441	21	4	0.196
1974	75.606	5.060	500	32	7	0.151

TABLE 6.1-1. *History of External Radiation Exposures at Pantex Plant (Continued)*

Year	Total Population Dose (person-rem)	Maximum Individual Dose (rem)	Number Monitored	Number with Zero Dose	Percent of Plant with Zero Dose	Average Population Dose (rem)
1975	61.887	10.800*	493	49	10	0.126
1976	45.765	1.050	463	33	7	0.099
1977	58.080	1.630	465	21	5	0.125

1978	50.460	2.300	518	73	14	0.097
1979	178.910	5.140	714	27	4	0.251
1980	147.520	4.500	819	100	12	0.180
1981	201.190	5.230	915	320	35	0.220
1982	110.760	2.070	1002	660	66	0.111
1983	103.180	2.330	1027	687	67	0.110
1984	141.708	2.200	1113	464	42	0.127
1985	133.558	2.540	1172	775	66	0.114
1986	85.590	1.510	1129	765	68	0.076
1987	34.850	1.410	1160	976	84	0.030
1988	24.980	1.240	1121	913	81	0.022
1989	33.560	1.440	1438	1264	88	0.023
1990	23.460	0.740	2090	1862	89	0.011
1991	22.310	0.530	2126	1905	90	0.010
1992	50.591	0.905	2317	1977	85	0.022
1993	44.825	0.850	2624	2228	85	0.017
1994	28.817	0.662	2978	2649	89	0.010
1995	36.623	0.764	3107	2791	90	0.012
1996	27.624	0.712	3209	2852	89	0.008
1997	10.991	0.432	3120	2790	89	0.004

[a] Federal limits in 1975 were 3 rem per quarter not to exceed 5 x (age of worker - 18) rem.

Cracked Pit, 12-98, Cell 1 (ORPS 1992-68)
On November 12, 1992, during dismantlement of a W-48 unit in Building 12-98, Cell 1 (a specially designed weapon disassembly structure), the outer nonradioactive layer of the plutonium containing component (pit) cracked. The cracking occurred while the component was being thermally treated to remove the HE. There were no immediate nuclear explosives safety concerns. The Supervisor and Production Technicians working in the cell immediately exited the cell and notified the Pantex Operations Center and Radiation Safety Department that the component had cracked. Radiation Safety personnel responded and, dressed in anticontamination clothing and respirators, entered the cell. Two radiation swipe samples were taken on the pit, with one smear taken directly over the crack. The results were 9,000 dpm for the smear taken on a location away from the crack and 57,000 dpm for the one taken directly over the crack. The component was then triple bagged and placed in a temporary container to prevent possible spread of plutonium. The filter from the cell's Continuous Air Monitor was removed and analyzed. The cell was surveyed for plutonium contamination. Only a tray that the pit had been placed on earlier was found to be contaminated. Nasal smear samples taken from the workers who evacuated were not
contaminated. The cracked component was radiographed using a cobalt-60 source. The radiograph confirmed that the crack was restricted to only the outer, nonradiological material. Procedures were developed by key personnel from LLNL and Pantex, and the final pieces of HE removed from the component. The pit was packaged for shipment to LLNL on January 15, 1993. LLNL evaluated the crack and determined that there was a defective weld in the waist area. The occurrence was determined to be "*not avoidable.*" All necessary remedial actions were performed in a manner that eliminated the risk of the spread of plutonium contamination and any degradation of safety. No nuclear explosive safety concerns existed.

TABLE 6.1-2. *History of Internal Radiation Exposures at Pantex Plant*

Year	Total Population Tritium Dose (person-mrem)	Maximum Individual Tritium Dose (mrem)	Number Monitored for Tritium	Average Population Dose (mrem)
1972	32.0	12.0	4	8.0
1973	0.0	0.0	1	0.0
1974	0.0	0.0	0	0.0
1975	0.0	0.0	0	0.0
1976	0.0	0.0	463	0.0
1977	0.0	0.0	466	0.0
1978	0.0	0.0	519	0.0
1979	0.0	0.0	712	0.0
1980	612.0	114.0	14	43.8
1981	582.0	122.0	41	14.2
1982	101.0	37.0	5	20.2
1983	0.0	0.0	0	0.0
1984	0.0	0.0	0	0.0
1985	11.0	3.0	17	0.6
1986	55.0	6.0	626	0.1
1987	8.0	2.0	481	0.02
1988	6.0	3.0	499	0.01
1989	1811.0	1180.0	212	8.5
1990	5.0	3.0	2341	0.002
1991	18.0	5.0	1115	0.02
1992	48.0	5.0	879	0.05
1993	183.0	14.0	1078	0.2
1994	115.0	11.0	1108	0.1
1995	101.0	12.0	971	0.10
1996	16.0	7.0	940	0.017
1997	3.0	1.0	933	0.00322

TABLE 6.1-2. *History of Internal Radiation Exposures at Pantex Plant (Continued)*

Year	Total Population Uranium Dose (person-mrem)	Maximum Individual Uranium Dose (mrem)	Number Monitored for Uranium	Average Population Dose (mrem)
1991	109.0	109.0	424	0.3
1992	778.0	502.0	239	3.3
1993	76.0	15.0	13	5.8
1994	0.0	0.0	0	0.0
1995	0.0	0.0	89	0.0
1996	0.0	0.0	69	0.0
1997	0.0	0.0	89	0.0

Year	Total Population Plutonium Dose (person-mrem)	Maximum Individual Plutonium Dose (mrem)	Number Monitored for Plutonium	Average Population Dose (mrem)
1991	0.0	0.0	0	0.0
1992	0.0	0.0	12	0.0
1993	0.0	0.0	0	0.0
1994	0.0	0.0	0	0.0
1995	0.0	0.0	28	0.0
1996	0.0	0.0	17	0.0
1997	0.0	0.0	18	0.0

Year	Total Population Thorium Dose (person-mrem)	Maximum Individual Thorium Dose (mrem)	Number Monitored for Thorium	Average Population Dose (mrem)
1991	0.0	0.0	0	0.0
1992	0.0	0.0	17	0.0
1993	0.0	0.0	0	0.0
1994	0.0	0.0	0	0.0
1995	0.0	0.0	67	0.0
1996	0.0	0.0	56	0.0
1997	0.0	0.0	13	0.0

TABLE 6.1-3.C*Percent of Total Doses Attributed to Neutron Radiation*

Year	Percent of Total Dose Attributed to Neutron Radiation
1988	11
1989	10
1990	8
1991	1
1992	30
1993	29
1994	23
1995	28
1996	21
1997	22

TABLE 6.3.1-2.C*Pantex Composite Statistical Summary*

	1990	1991	1992	1993	1994	1995	1996	1997	Average
Equivalent Full-time Employment	2274	2468	2728	2907	3207	3348	3358	2979	2909

As in the case of the IAAP plant in Middletown, Iowa it appears clear that too few workers at Pantex were radiologically monitored for accurate and valid dose reconstructions to be performed for the majority of the workforce.

It is unclear why certain workers were monitored and others were not and the representative nature and accuracy of available records are questioned for several reasons. The assumption that available records reflect worst case scenarios or highest exposed work groups does not appear to be borne out by worker histories. Production workers in the bays working with or around fissile components were not uniformly monitored. As in the case of IAAP, workers involved in bomb disassembly or repair and guards were not routinely monitored in the early years of operation. Similarly radiation shielding was not the norm in early years. There is concern regarding technical limitations and accuracy of exposure assessment methodology from the earlier years of operation including inability to directly measure neutron exposures. The historical health and safety practices of early DOE facility operations have at best been deemed insufficient by current standards for protection of workers. The training and practices of DOE site radiologic health and safety staff in during the Cold War era has been called in to question at several sites and Pantex was recognized by DOE's own health and safety audits repeatedly as being deficient.

Worker histories reflect concerns regarding area exposure monitoring based on technical failures as manifest primarily by frequent "false alarms". In addition we heard about several situations in which tritium leaks occurred and believe there is uncertainty in the accuracy and completeness of radiation exposure data regarding such events. The impression from reading the available NIOSH documents is that one such exposure occurred whereas workers indicated that such events were not uncommon and reported a practice of the medical office sending workers home with prescriptions for a "case of beer".

In the early days (approximately 1960 through 1990), the Pantex Plant Safety Department was much smaller than it is today. The plant population for most of this time was approximately half that of what it is today with 1,500 to 1,700 employees. In addition to the difference in overall plant workforce, there was also a different division of labor. Jobs or functions that are now performed by radiation technicians and transportation employees were done by the approximately 12 safety engineers and 4 safety inspectors. The safety engineers and inspectors received fissile material from Rocky Flats and other locations, opened the containers, performed swipes, etc., before placing the items in storage. When the fissile material went to the line, the items were again swiped by these same individuals. Chemical technicians performed urinalyses and kept track of dosimeters in use at the time. These individuals were apparently in another department. There were also 2 to 6 employees in industrial hygiene. Their exact function is not known, but is assumed to be similar to what they do today. At least one of the early IH employees is still employed although she was diagnosed with breast cancer approximately 20 years ago and has had at least one recurrence of this disease.

Swipes done on the line are now performed by radiation technicians. Prior to 1990 training and staffing of radiology technical staff was deemed insufficient to ensure worker safety by the DOE's own audit, enclosed below. In the early 1990s there were approximately 3 to 6 radiation safety technicians. In approximately 1992 to 1994, the plant hired a specialist from Texas A&M to present training that would qualify interested employees for these positions. Several of those who received this training later went onto get their NRRPT or other certifications.

The individuals in the Safety Department were some of the first employees at the plant to receive and wear lead aprons. Others who came in contact with the fissile material in weight and leak checking, inventorying, etc., were only issued lead aprons after they asked repeatedly for them. Approximately half of the individuals who worked as safety engineering in the early years have died. At least one of these workers died of some form of cancer and another death was heart related. One of the individuals is being followed for chronic beryllium disease. The cause of death for those who are no longer living is unknown.

The following three incidents are described in a Pantex Safety Information Document dated October 1998:

Assembly Cell Contamination w/Plutonium.
On November 6, 1961, at 9:30 p.m., operators on the second shift were removing a pit from a weapon when a tube in the pit ruptured. As a result of the accidental rupture, radioactive contamination was released in Building 12-44, Cell 6. This building is an assembly cell used during the assembly and/or disassembly of weapons with plutonium bearing pits. Since the weapon component was under a slight pressure, plutonium particles were blown into the air. The particulate plutonium was then caught up in the air conditioning and was scattered throughout the cell. There were no personnel injuries as a result of the incident. Three people were in the cell at the time, one foreman and two operators. Both operators were wearing the appropriate safety clothing, including respirators. The foreman was approximately 1.8 km (6 ft) away, opening the pit container to receive the pit. He was not wearing a respirator. One operator was lifting the pit and looked down and saw the tube bent completely back against the pit. At the same time he heard a hissing sound. The operators hurriedly placed the pit back in the high explosive (HE) and, together with the foreman, quickly evacuated the cell. A nearby safety man told the personnel to wait in a designated area while he notified safety and supervisory personnel and obtained monitoring equipment. When contamination was apparent, he furnished the men with clean respirators and isolated their clothing until the Radiation Safety personnel arrived. An immediate check by the Radiation Safety personnel indicated

that the personnel were contaminated; however, it was possible to completely decontaminate them. Urinalysis was immediately begun on these three individuals. Results indicated that none of the persons involved had received an internal deposition of plutonium.
The next day measurements were taken in the area of the cell, both in the enclosed ramp area and around the exhaust vents
outside the cell. It was determined that no significant radiation contamination was released to the atmosphere. The second day following the incident, the airborne radioactive material inside the cell had substantially settled out, and approval was received to begin decontamination. Subsequent decontamination removed all detectable plutonium from personnel, equipment, and the operating area. Property damage was limited to various pieces of tooling and equipment
for which, due to their nature, decontamination was not possible and/or economically feasible. Cleanup efforts cost approximately $26,000.

Tritium Release, 12-44, Cell 1.
Another incident occurred in May 1989, during a normal weapon disassembly and retirement operation. The Pantex Emergency Plan was activated. An electroexplosive squib was initiated, which resulted in the actuation of the reservoir valve. Operation of the valve caused deuterium-tritium gas to be transferred into the pit and resulted in the subsequent release of deuterium-tritium into the assembly cell. The tritium release to the room occurred when the operator/technician, who did not realize the valve had functioned, loosened a pit tube gland nut before removing the reservoir. None of the five operator technicians present heard or smelled the firing of the explosive squib. The two operator/technicians working on the weapon did not notice that the protective cover on the valve's thermal plug had been ejected. Investigation of the valve confirmed actuation by means of explosive firing. It should be noted that although the valve actuation, gas transfer to the pit, and subsequent personnel exposures are undesirable from an environmental or occupational safety and health point of view, at no time was there a nuclear explosives safety concern, which could have endangered any person at Pantex Plant or within the general population. An estimate of 40 kCi of tritium gas was released into Cell 1 during the incident. The dose to the maximally exposed individual was 1.3 rem and less than 1.5 rem for all monitored individuals. The dose estimate at the site boundary was less than 1 mrem. Tritium is a widely used radioisotope at many DOE laboratories. It decays by beta emission to He-3 with a half-life of 12.32 years. The maximum energy of the beta particles emitted is 18.5 keV, and the average energy is about 5.7 keV. With one exception, this is the lowest-energy beta emitter known. These beta particles
do not have enough energy to penetrate the dead layer of skin covering the human body; therefore, tritium is not an external
hazard but is of concern if the gas is inhaled or absorbed through the skin. The amount of skin absorption equals the rate of
assimilation through inhalation. Building 12-44, Cell 1 is designated a contamination area at the Plant and is no longer
used.

Enclosed immediately below is the abstract of a 1990 National Institute for Occupational Safety and Health, NIOSH, study entitled: MORTALITY UPDATE FOR THE PANTEX WEAPONS FACILITY: FINAL REPORT HEALTH-RELATED ENERGY RESEARCH BRANCH, Publication No. 2005-124. This study measured increased Standardized Mortality Ratios among Pantex workers for breast cancer, prostate cancer, multiple myeloma and leukemia, somewhat weighted towards earlier periods of employment at the plant.

ABSTRACT

In 1985, Acquavella, et al. [1985] reported the results of a cohort mortality study of white male workers ever employed at the Pantex Plant between 1951 and the end of study date, December 31, 1978. Compared to U.S. death rates, the mortality experience of these workers suggested a strong healthy worker effect overall, but non-significant elevations were observed for leukemia and brain cancer. For the current analyses, the National Institute for Occupational Safety and Health (NIOSH) expanded the study population to include workers of both genders and all races ever employed between 1951 and 1978 and extended vital status follow-up through 1995. Summary Standardized Mortality Ratios (SMRs) were generated for these workers (the full NIOSH cohort). Workers terminating or deceased by December 31, 1978, for whom complete employment records were available (the early-term subcohort), were included in SMR and Standardized Rate Ratio (SRR) duration of employment analyses. The all-cause SMR for the early-term subcohort (0.98, 95% confidence interval (CI) = 0.92-1.05) was higher than that seen in the full NIOSH cohort (SMR=0.81, 95% CI=0.76-0.86) and by Acquavella et al. [1985] (SMR=0.72, 95% CI=0.64-0.81) and was close to that expected from U.S. population rates. Brain cancer was no longer elevated in the full NIOSH cohort (SMR=0.51, 95% CI=0.17-1.19) in the updated analysis, although the confidence intervals span unity. The leukemia SMR was elevated (earlyterm subcohort SMR=1.47, 95% CI = 0.73–2.63) but SRRs showed no evidence of a positive exposure-response relation with increasing duration of employment. Lung cancer SMRs with 10- and 15-year lags were just below expectation. Breast cancer was elevated only in workers with employment durations of 5 to 10 years. The SMR for prostate cancer was as expected, but this outcome showed a statistically significant positive exposure-response [slope: 1.36·10-5 per person-year (PY)·year of employment (YOE), standard error: 4.31·10-6 per PY·YOE], with a

very high, though imprecise, point estimate (SRR=7.57, 95% CI=1.03--55.72) for workers employed at least 20 years with a 10-year lag imposed. Multiple myeloma also exhibited a statistically significant positive exposure-response. Due to the potential for positive bias in the early-term subcohort, caution should be exercised in generalizing the exposure-response results. These findings suggest the need for collection of full employment information about workers employed beyond 1978, as well as the estimation of occupational exposure for Pantex workers.

In addition to the paucity of radiologic monitoring data, the accuracy of the available radiation exposure data is called into question by the lack of quality assurance data, and the subsequent recognition of inadequacies in the radiation health and safety programs documented by the 1990 Tiger Team Assessment of the Pantex Plant Amarillo, Texas, DE000634. The report is replete with reflections of the auditors' concerns regarding the plants' health and safety program adequacy.

Section E.3. 1. 2, page E-5 contains the bullet point: "Responsibilities of M&H's ES&H Division are not clearly identified in terms of radiation protection. (S/CF-11)

Section E.2.6, page E-11 contains the bullet point: "Procedures have not been written to reflect all surveillance requirements included in the Final Safety Analysis Report. (S/CF-5)

Section E.3.2.12, page E-14 contains the bullet point: " The control of radioactive sources is inadequate to prevent unnecessary exposure. (RAD/BMF-2)".

Section E.3.2.18, page E-18 contains the bullet " The size and qualifications of the radiation protection staff are particularly deficient."

A particularly troubling observation of the auditors on Page F-34 was in relation to weapons teardown exposures in 1989 and inadequate maintenance of employee exposure records:

"29 CFR 1910.20(d)(1)(ii): Employee exposure records were not maintained for at least thirty days: a. Records were not maintained of dpm readings of clothing, hair and nasal swipes of one of three employees who was exposed to depleted uranium during a weapon teardown operation in Bay 26, Building 126 b. Records were not maintained of dpm readings taken for employees who were involved in clean-up of Bay 26, Building 126"

An abstract from this report is appended below. The relevant section begins with:

"4.5.5 RADIATION PROTECTION, PERSONNEL PROTECTIO, AND FIRE PROTECTION...

4.5.5.2 " Compliance Findings: Radiation protection staff unable to fulfill mission...." On page 4-19

After the Tiger Team Report the Environment, Health and Safety staff at Pantex grew dramatically in recognition of training, staffing and documentation inadequacies. The identified inadequacies support workers' concerns that monitoring, protection and record keeping were historically inadequate for health and safety of the workforce.

Discussion

A Pantex Plant safety study identified assemblies containing radioactive material that were vulnerable to a projectile resulting from the accidental or deliberate firing of security force armament. Considered in the study were assemblies that were a source of energy sufficient to scatter associated radioactive material. Field tests confirmed the results of the study.

The study resulted in procedural changes for the security force and the development and use of protective armor coverings for assemblies of concern. (I-S-34)

4.5.5 RADIATION PROTECTION, PERSONNEL PROTECTION, AND FIRE PROTECTION

4.5.5.1 Overview

The team concentrated its assessment on Radiation Protection. The findings reflect a general inadequacy of the radiation protection program as evidenced by extensive noncompliance with DOE 5480.11. Furthermore, there is little likelihood that this situation can be corrected anytime in the near future. This situation has been known to M&H, AAO and AL for several years but little has been achieved to correct it (S-23). See Finding S/CF-1. An interim resolution of this concern was provided by AAO action while the Tiger team was on-site. See Appendix N. In addition AL has initiated a study team action to review this concern indepth and report to the AL manager.

The team performed a limited review of fire protection. The review showed that findings from the June 1987 Technical Safety Appraisal have been closed or are on schedule for their resolution. The OSHA team performed an audit on the NFPA 101 Life Safety Code in the fire protection area and on personnel protection. The OSHA findings are reported elsewhere.

4.5.5.2 Compliance Findings (CF)

- *S/CF-10*
  Radiation protection staff unable to fulfill mission

  Performance Objective

  Procedures, controls and documentation should ensure worker protection from radiation exposure. (DOE 5480.11)

Finding

AL, AAO and M&H are not fully complying with DOE 5480.11. The size and practices of the radiation protection staff are particularly deficient.

Discussion

- The results of many surveys are without documentation. It is the practice for many production surveys to be conducted by staff other than trained Radiation Protection Technicians (RPT) of the Radiation Safety Department. (S-22)
- Of those radiation surveys taken by RPTs, the data are not trended for the purpose of identifying potential problems.
- There is currently only one professional health physicist assigned to assembly, disassembly and fabrication operations. He both oversees operations personnel and supervises radiological protection technicians in these areas.
- Only three RPTs are functionally assigned to production operations and are responsible for ensuring the radiation protection program for about 400 to 500 radiation workers. (S-20 and S-21)
- There is no written approval of new and revised operating procedures by staff of the Radiation Safety Department, including those procedures involving radiation safety issues per MC 706 Decontamination B-28, 28-9012, Issue Q. (S-19)
- Prior to June 1989, no protective clothing was required for the B-28 program disassembly operations. Swipes were made of weapons to assure they were contamination free, but no records exist regarding possible contamination of the workers. (I-S-16 through I-S-20)
- AAO prepared and submitted an action plan with six draft exemptions that stated that Pantex could not achieve compliance with the order in calender year 1989. From January to June 1989, three draft plans and five formal memos were prepared identifying problems with the implementation of the order.

S/CF-11

Radiation protection audits lack sufficient independence and rigor

Performance Objective

Site management should ensure effective implementation and control of radiological protection activities within its facilities. (DOE 5482.1B and 5480.11)

Finding

M&H appears to lack sufficient independence to conduct internal audits of the radiation safety program.

Discussion

Examples supporting this finding:

- The only technically trained radiation protection staff (i.e. health physicists) outside of the Radiation Safety Department are still part of the Environmental, Safety and Health (ES&H) Division. This lack of resources to support the organizational structure does not allow the independence required by DOE 5482.1B.

- The ES&H Division has only one individual responsible for conducting Quality Assurance/Quality Control (QA/QC) audits of radiation protection programs required by DOE 5480.11. DOE granted the necessary security clearance for that individual in June 1989. Until that time, the audits performed by that individual were accomplished without the benefit of ever having seen the plant operations first-hand nor having reviewed classified information relevant to the operations under audit (I-S-21).

- Radiation Safety personnel within the ES&H Division lack clear understanding of their responsibilities. In particular, staff in the Radiation Safety and Risk Management Departments have different, and sometimes conflicting, priorities.

M&H, through its implementation plan for compliance with 5480.11, has requested additional staff for radiation protection. Whether such action will eliminate this finding cannot be determined at this time. See Finding S/CF-13.

S/CF-12

Inadequate training program for radiation protection technicians

Performance Objective

The radiological protection personnel training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions. (DOE 5480.11)

Finding

The training program for radiation protection technicians (RPT) is not fully adequate

Discussion

Requirements and guidance for personnel training and qualification are provided in DOE 5480.5, DOE 5480.11, ANSI/ANS3 1, (S-24) ANSI N13.6, (S-25), ANL-88-26, (S-26), and NCRP 84, (S-21). DOE requires that all occupational workers in DOE facilities receive, as a minimum, orientation in radiation safety. The level of training shall be commensurate with the employees work assignment. The training program shall promote an awareness of the risks involved and a level of proficiency consistent with the assigned task.

Examples supporting the finding include:

- M&H has no formal documented training or retraining program for its RPTs. DOE 5480.11 requires RPT retraining every 2 years: (I-S-22)

- The records documenting the technical content of training provided to RPTs (including classroom and applied training) do not assure that RPT's possess the knowledge of radiation safety fundamentals required by 5480.11 [para. 9.0.(3)]

- Several M&H staff responsible for radiation safety are relatively new employees and either lack or just recently received security clearances. This has contributed to the inability to provide professional observation, training and guidance to the RPTs.

- A review of the investigation reports on the May 17, 1989 tritium release revealed a lack of specific tritium training for the response team and for general contamination control procedures for site personnel.

This finding has been known to the staffs at M&H, AAO, AL and HQ since June 1985 (DOE/EH-0005). M&H has requested authorization in January 1989, to hire one additional person to help alleviate this problem.

S/CF-13

Inability to comply with DOE radiation protection Order requirements for occupational workers in the future

Performance Objective

Implementation of DOE 5480.11 by January 1, 1990

Finding

It is unlikely that the Pantex Plant will be able to achieve full compliance with DOE Order 5480.11 by January 1, 1990, or anytime soon thereafter.

Discussion

DOE Order 5480.11, Radiation Protection for Occupational Workers, was effective as of December 21, 1988, with full compliance mandated by January 1, 1990. In accordance with formal DOE/HQ guidance, M&H developed an implementation plan that addressed the technical approach, cost and schedule for achieving compliance at the Pantex Plant. The implementation plan identified technical and administrative approaches for achieving compliance that would be significantly different from current practices and would pose significant impacts on cost, schedule, manpower, and production. AL submitted the initial implementation plan to DOE/HQ on March 9, 1989.

Reasons why timely implementation of the order is unlikely:

- The draft implementation plan M&H submitted on March 3, 1989 contains requests for 33 to 35 full time equivalent personnel and $22 to $25 million capital funds. A further request on May 24, 1989, detailing six exemption requests plus further details on equipment costs was submitted. Some exemption requests asked for extension to five years past January 1, 1990. To date, neither AL or HQ has provided formal comments to AAO and M&H regarding the adequacy and appropriateness of their implementation plan.

- The competition for qualified new staff, particularly those with security clearances, is intense and getting even more severe.

Even though the order was not released until December 1988, the requirements identified in this finding would have been known to most responsible and conscientious health physicians and their managers within the DOE community by at least early 1988. Since then, the net staffing in the M&H Radiation

Safety Department has actually decreased. Currently M&H has three RPTs on its roles and has requested authorization to hire 20 more in its draft DOE 5480.11 implementation plan A total of 23 RPTs is consistent with recommendations of the plutonium and uranium manuals of good practices. (S-20 and S-21) Both manuals recommend one RPT for each 20 radiation workers as well as one or more professional health physicists. These recommended ratios do not include administrative or supervisory staff. Even if M&H is successful in recruiting new staff, security and training requirements make meaningful relief in the near future unlikely. (I-S-23 through I-S-26)

Associated with this finding is a best management practice that would provide a "pre-employment" or "new employee" base line for radiological exposure due to site activities. Some DOE sites require whole body counts and bioassays of new employees with possible duties involving direct or accidental radiation exposure. This baseline data also assures the contractor that he has not employed an individual with excessive exposure due to past activities or conditions. A whole body counter housed in a low background counting room was requested by M&H in their implementation plan to DOE order 5480.11, January 26, 1989.

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