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July 8, 2010

VIA EMAIL

Senator Fletcher L. Hartsell, Jr.
300 N Salisbury St Room 518
Raleigh, NC 27603-5923
Hartsell@ncleg.net

Dear Senator Hartsell:

Please be advised that I have followed with interest the inquiries made by the Senate regarding the health and environmental conditions in and around the Badin facility. Our office represents hundreds of the retirees at that facility and some of the few remaining employees. We also represent many family members and property owners who live near the facility and individuals who drank water and ate fish out of the lakes.

While I was initially present on Tuesday for the Senate hearing, I had to leave before Mr. O'Rourke, the representative for Alcoa, testified. I have read with great interest and surprise his testimony and on behalf of my clients, I would like the opportunity to comment on some of that testimony as they believe this information may be of some benefit to your committee.

With respect to the references and testimony given regarding the medical monitoring lawsuit, our law firm with Tennessee co-counsel Greg Coleman, a Knoxville attorney, filed that lawsuit in Knoxville, Tennessee. The name of the lawsuit was Pryor et al vs. Alcoa, case number 167957-1. The purpose of the lawsuit was to compel Alcoa to medically monitor its workers in Tennessee for the early detection of cancer. The trial court in Pryor denied Alcoa's Motion to Dismiss the class case. This is of public record. Attached is an affidavit from Sally Laster, Exhibit 1,that was signed by her on July 3, 2008 for use in the Pryor case. She does not know about this particular North Carolina issue, nor should she, but this was her testimony for use in the Pryor case.

Mr. O'Rourke is confused about the place where the suit was brought. It was brought in Knox County Chancery (not Blount County District Court). Further, the dismissal was agreed upon after Alcoa insisted that it had a medical monitoring program in place and agreed to send and did send out the letters to retirees all over the country concerning the medical monitoring for coal tar pitch (PAHs). In fact, one of the reasons for the hold up on this case was that the parties insisted that the same or similar letters must go out to everyone and they could not just be sent to Tennessee operations only. Specifically, since the letters were going to be sent, Alcoa wanted uniformity and counsel for Mr. Pryor were told by counsel for Alcoa that "if we do this for one

plant, we have to do this for all of them". Once the letters were sent and medical monitoring for retirees (not just active employees) was actually being conducted, the reason for the lawsuit was accomplished. Our firm and Mr. Coleman have voluntarily assisted the retirees in procuring the medical monitoring. Unfortunately, this monitoring is limited only to the early detection of bladder cancer. The monitoring letter sent to the Badin employees and retirees is Exhibit 2.

Mr. O'Rourke was questioned whether Alcoa had studies that looked at its employees relative to deaths relating to prior exposures. He indicated that we are doing that now. In that regard, we believe that Alcoa could very easily conduct a meaningful study of the cause of death and disease among the Badin employees, retirees, and the community. In June, 2000, Alcoa ran data for active/former employees at its U.S. locations to estimate the number of cases of potential bladder and lung cancer that might be seen over the next 30 years in that workforce resulting from the coal tar pitch exposures. Further, Mr. O'Rourke was copied on July 11, 1996 with Alcoa's e-mails regarding the increased kidney cancers being seen at the Alcoa smelters including the Badin smelter. Despite the discussions therein of at least a 3.5 fold increased risk for the development of kidney cancer, no mention is made of this increased risk for the development of kidney cancer in the letter addressing the need for medical monitoring nor did Mr. O'Rourke mention it when asked about studies relating to occupational exposures. See Exhibit 3.

Alcoa's medical director, Dr. Mark Cullen recognizes in the November 11, 1994 notation that kidney cancer, like lung and bladder must be included in the legacy of historical problems we have to eradicate. Exhibit 4.

Other mortality studies of interest include the Proportionate Mortality Study which was a study of Alcoa workers from 1980 until 1987. It includes summaries of other Alcoa based mortality studies including the Tripartite Committee Study that involved Alcoa and two other aluminum production companies. Exhibit 5.

Mr. O'Rourke also discussed that Alcoa takes environment, health and its safety values seriously and is proud of its record, stating that "when you find something wrong, you disclose it and then you deal with it." He further testified that Alcoa has a 'world-renown health and industrial hygiene program."

Mr. O'Rourke has firsthand knowledge of problems at Badin which he did not address during his testimony. An internal memo dated April 17, 1996 was directed to Mr. O'Rourke. This document references "big time health issues" and focuses almost exclusively on Badin. Paragraph 4 of the document acknowledges the sampling program is weak. It noted that Alcoa Badin had an ineffective respiratory protection program as was evidenced by poor audit scores. It concluded that Alcoa was less equipped with engineering control of health hazards than was its competitors. Further that OSHA standards and Alcoa's World Wide Health Protocols required engineering control feasibility assessments. It listed chronic obstructive lung disease among the potroom workers as a health issue. It noted that the crystalline silica associated with carbon bake and the motel metal furnace installation, repair, and overhaul was an issue because quartz and critobalite are carcinogens. This document recognized that coal tar pitch volatiles needed to be reduced and that dermal/skin absorption was a significant route of exposure. The document lists

16 total areas of problems including CTP, Silica, neuro-toxicity issues with aluminum, and fluoride. Exhibit 6.

Several Senators asked Mr. O'Rourke whether Alcoa would be willing to share information regarding the prior worker's compensation claims and the evidence that was gathered in those cases for public review.

I have no knowledge of the number of claims filed by other law firms although I am aware that other firms have also represented Alcoa workers and have filed work-related claims for them for injuries and diseases allegedly arising out of exposures at the Badin facility. With respect to my firm however, Wallace and Graham has been representing Badin workers since approximately 1999. We have filed over 200 individual work-related claims. These have been for disease and death claims, including but not limited to, mesothelioma, lung cancers, throat/laryngeal cancer, brain cancer, skin, pancreatic cancer, multiple myeloma, tongue, kidney, colon, bladder, esophageal, and stomach cancers. Further, we have sought benefits for workers for various non-cancer claims including but not limited to hearing loss, asbestosis, silicosis, COPD, potroom asthma, bronchitis, emphysema, and various other respiratory illnesses. Alcoa has denied all but one of those claims.

We currently represent one individual from that facility who was simultaneously suffering from three different cancers, lung, bladder, and kidney cancer. Also there have been many families who have contacted us whose loved ones worked at the facility who died of some of the same cancers or diseases. We have decline representation because of the statute of limitations with one limited exception. The exception is we presently represent one individual who died of kidney cancer many years ago. Alcoa has filed a motion to dismiss the filing of the claim for being untimely. Our firm has taken the position that his claim should not be dismissed because he was not advised of the risk for his development of kidney cancer despite having been an individual who was in the kidney cancer study being conducted on/or about the time of his death in the mid-1990s.

We do not believe that Alcoa has cooperated in responding to our requests for information in our representation of the workers. I am providing copies of various court orders as Exhibit 7 which were entered by the N.C. Industrial Commission resulting from attempts by Wallace and Graham to seek documents requested for our representation for injured workers out of the Badin facility. We believe these Orders accurately identify Alcoa's lack of candor in providing information about the Badin facility. The names of our clients have been redacted. However, please take note of the Order dated April 13, 2006, which denied Alcoa's request that our firm be limited or restricted in the use of these documents.

With respect to Mr. O'Rourke's comments regarding the lawsuit filed by the Mohawk Indians against Alcoa, he indicated that there is no decision yet. I am attaching a copy of the proposed Settlement Agreement and proposed Order in that case, which we obtained from the United States District Court's website, a public website. You should note that Alcoa's attorney has signed the Settlement Agreement and the Court has approved it. The settlement would provide for the Defendants Alcoa and General Motors Corporation to provide millions of dollars into a trust which would partially be used to fund health care to defray medical and/or health related expenses incurred by potential plaintiffs for services not otherwise covered by existing

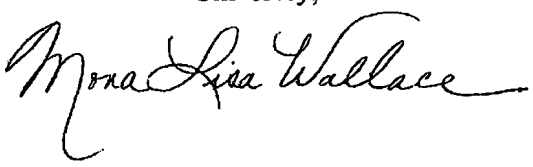
plans or policies. That lawsuit allegedly involved Alcoa and others exposing Plaintiffs to PCBs through a common pathway—consumption of PCB-contaminated fish. Exhibit 8.

Mr. O'Rourke was asked by Senator Vaughn if 'in any of your studies, has there been a connection between the PCBs produced by Alcoa at Badin Lake and any cancer or any other disease?" According to Mr. O'Rourke, "we have had no definitely analysis of that." I am attaching Alcoa's Industrial Hygiene PCB Policy Statements. While this is dated 1979 and more knowledge has been acquired about the carcinogenic nature of PCBs since that time, this document notes the health effects known by 1979 including but not limited to skin diseases, liver problems, increased incidences of liver cancer in animals, and reproductive effects. Exhibit 9.

I apologize for the length of this letter of this letter but wanted to shed light regarding your inquiries. In supplying these documents, I do not imply that the documents attached to this email are the totality of documents on the issues or that I have possession of all documents on the issue.

Thank you for the opportunity to address these issues on behalf of my clients.

Sincerely,



Mona Lisa Wallace

MLW/cgp
Enclosures

EXHIBIT

1

IN THE CHANCERY COURT FOR KNOX COUNTY, TENNESSEE

RAY PRYOR, STANLEY JANEWAY, ROBERT K. WHITEHEAD, REBA ORR, GLEN GREGORY, JOE BIBLE AND MIKE RUTHERFORD, on behalf of themselves and a class of persons similarly situated,	)	
Plaintiffs,	)	Case No. 167957-1
vs.	)	
ALCOA, INC. f/k/a ALUMINUM COMPANY OF AMERICA, a Pennsylvania corporation,	)	
Defendant.	)	

AFFIDAVIT OF SALLY LASTER

STATE OF TENNESSEE)
) ss:
COUNTY OF KNOX)

1. That my name is Sally Laster. I am over 18 years of age and I have personal knowledge of the facts set forth in this Affidavit.

2. From 1978 to 2003, I worked as a nurse at the on-site clinics for Alcoa, Inc. (ALCOA) in Alcoa, TN.

3. When I first started working for ALCOA as a nurse I worked in the West Plant, North Plant and South Plant clinics. Sometime thereafter the West Plant closed, and I then rotated between the North and South Plant clinics.

4. During my time while working as a nurse at the ALCOA on-site clinics, I became aware that testing began for coal tar pitch products. Specifically, it was my understanding based upon information given to me from ALCOA that all workers who worked in the production areas of the Soderberg areas of the plant were to receive annual medical surveillance for their exposure to coal tar pitch and coal tar pitch products. Although the Soderberg plant closed in 1975, the medical surveillance program of ALCOA required that all workers who worked at ALCOA for ten years in the Soderberg production area were to receive annual medical surveillance while as an active worker and as a retired worker.

5. In addition, the ALCOA medical surveillance program also called for all workers who worked in the pre-bake area and specifically in the following areas: pot bake-in or start-up; Green Mill/paste plant; carbon bake/bake oven/ring furnace; pot lining/cathode repair; carbon plant utility services such as maintenance, electricians/mechanics, environmental technicians; and who had previously worked there for more than a year with it being ten years since they first worked there were entitled to annual medical surveillance as both active workers and retirees.

6. It was my understanding at the time coal tar Pitch testing began that if you worked in the pre-bake and Soderbreg areas as outlined herein, you were entitled to medical surveillance as both an active worker and as a retiree for the rest of your life.

7. In my role as a nurse who worked at the ALCOA North, South and West Plant clinics and, specifically, when coal tar pitch testing began, the only test that was ever given for these workers was a urine test, which required the active employee to

jump up and down and then urinate in a cup. During the entire time that I worked for ALCOA while the coal tar pitch testing was done, only a small number of eligible retirees were, in fact, tested with the urine sample being the only test.

8. There was never a sputum test, x-ray, or blood work done for coal tar pitch-exposed workers other than the urine test as indicated herein. There was also never any testing specifically for kidney cancer or for lung cancer even though they are known risks of coal tar pitch exposure.

SALLY LASTER

Sworn to and subscribed before me, this the 3 day of July 2008.

Notary Public
My Commission Expires: 7-10-2010

DAWN L. HOLT
NOTARY PUBLIC
STATE OF TENNESSEE
KNOX COUNTY

EXHIBIT

2

Alcoa Primary Metals
Alcoa Power Generating Inc.
Yadkin Division
283 NC 740 Hwy
PO Box 576
Badin, NC 28009-0576 USA

April 18, 2007

Z. Tommy Gibson
Manager, Alcoa Badin Works
Highway 740
Badin, North Carolina 28009

Dear [redacted]

While employed at Badin Works a Coal Tar Pitch Medical Surveillance program was established. We are writing to inform you about medical information that is important to people who work in the aluminum smelting industry because you are included in this program.

Alcoa and its external consultants conducted a review of the current scientific information regarding Coal Tar Pitch (CTP), which is a substance used in the aluminum-making process. The review showed that at lower levels of exposure than previously indicated, a small excess in risk for lung and bladder cancer has been observed. Alcoa's review has been endorsed by outside scientific and medical experts.

Historically, Alcoa controlled exposures to CTP in accordance with the standards promulgated by applicable laws and regulations. However, the results of Alcoa's review suggest that more stringent controls are warranted. For that reason, Alcoa introduced in its smelters around the world a more rigorous control strategy that goes beyond what is generally required by law. Alcoa independently undertook its review, and is voluntarily instituting new controls for employees working with CTP.

Although these controls will have no direct impact on you, we did want to remind you of the results of Alcoa's review, so that you may share the information with your physician. You should be reassured that the level of risk to many former Alcoa employees is generally quite small. We are enclosing a medical fact sheet for you to take to your doctor.

Again, you should be reassured that the level of risk to many former Alcoa employees is generally quite small. Alcoa's actions with regard to CTP are consistent with our Value system, our practice of acting very conservatively when it comes to protecting employee health, and communicating new health issues to interested individuals and improving health controls whenever new information warrants.

If you or your physician have any questions please call the Alcoa CTP line at 1-800-738-5230, Monday through Friday from 10:00 a.m. to 4 p.m., EST.

Sincerely,

Tommy Gibson
Manager, Alcoa Badin Works

Attachment: CTP Physician Fact Sheet

CTP FACT SHEET
For Physician Use
(05/23/05 1:47 PM)

Coal Tar Pitch Volatile Cancer Risks: Alcoa Fact Sheet for Physicians

Alcoa has prepared this material for physicians to help determine if certain tests may be advantageous to people who worked in aluminum smelting facilities and are now no longer actively employed.

Background
Several years ago one of the large aluminum companies sponsored a series of studies regarding Coal Tar Pitch (CTP), which is a black tarry material used in aluminum smelters.

CTP, which is generally consumed in the smelting process and must be constantly replenished, is composed of a mixture of organic chemicals, including "polyaromatic hydrocarbons" or PAHs. Some of those PAHs, such as benzo(a)pyrene, are known to be carcinogenic. For many years Alcoa and other large aluminum companies have controlled exposure to CTP to reduce the likelihood of any known health effects. In fact, the major technology now in use, called "pre-bake," limits exposure to coal tar pitch to only a very small number of smelter workers.

The CTP studies were undertaken to determine whether there were any risks for cancer at the lower levels of CTP exposures which might still be occurring in the aluminum industry. The published results suggest that some cancer risk may exist, despite the historic controls which had been in place. For this reason, Alcoa is now introducing a series of steps to further protect its workers, including retirees who may have worked in one of the areas of the smelter where CTP was used. Your patient is such a former Alcoa employee.

Summary of Findings

A summary of the results of the studies is as follows:

Two types of cancers, lung and bladder, have been shown to occur at higher risk among CTP exposed workers as compared to those without exposure in the smelters. The levels of this risk are quantitatively small given the past controls. Specifically, the data show that for a group of 100 workers who worked for 40 years at or above the U.S. OSHA regulatory limit, it would be expected to have about two extra cases of lung cancer and an equivalent number of bladder cancers as compared to the general population. Exposures in this range or higher may have occurred in Soderberg facilities, the tunnel kilns at Warrick and some prebake jobs. However, most Alcoa workers had CTP exposures at lower levels or worked in high exposure areas for short duration. For these individuals the risk for cancer will be proportionately lower. For example, if your patient worked in direct contact with CTP for 10 years, and the rest of the time worked in less exposed jobs, the risk may be as low as 1/4 of the maximum risk. For many former employees the individual risk will be much lower still.

To evaluate risk, your patient can describe the tasks and specific jobs they performed during their Alcoa career; as well as historic exposures associated with these jobs and any controls that may have been in place during the relevant time periods.

Medical Surveillance

The Alcoa retirees and former employees will not be able to directly benefit from the more stringent new exposure controls we are instituting in all of our smelters at this time. However, there may be benefits to screening such an individual for early detection of bladder cancer and counseling that individual on other methods to reduce his or her overall cancer risk.

We would like you, as treating physician, to arrange for appropriate tests, and follow up on any abnormalities with the goal of early detection for bladder cancer. As you know, this approach has saved many lives in other industries where chemicals have increased risk for this disease and the tests are safe and

easy. Further, symptoms or signs of lung or skin cancer should also be evaluated promptly even if your patient has no other known risks for this disease. Individuals with high dermal exposures are at risk for low grade skin lesions. Perhaps most importantly, since other risks for lung cancer remain very important, this would be an excellent opportunity to reinforce efforts to eliminate smoking or any other risk factors for lung cancer, which could be modified.

Claim Filing Procedure and Information

Claims for this office visit and appropriate related tests should be sent to:

Highmark Blue Cross Blue Shield – Coal Tar Pitch
P.O. Box 535083
Pittsburgh, PA 15230

The claims for exam and testing will be covered at 100% of a reasonable and customary fee schedule for those services. Please do not charge your patient a copayment for these services.

Telephone Number for Additional Information

The Occupational Medicine Department at Alcoa has established a dedicated contact for CTP information to answer questions, to review strategy, or help you in assessing information on newly available bladder screening assays. If you have any questions please call 1-800-738-5230, Monday through Friday from 10:00 a.m. to 4 p.m., EST.

EXHIBIT

3

Author: Kathy L. Lang at ~AMPCCN3
Date: 7/11/96 12:14 PM
Priority: Normal
TO: Felicia J. Bayer at ~PITCCN2
TO: Harvey Checkoway at ~AMSCCSSW
TO: Christine C. Dixon-Ernst at ~PITCCN2
TO: Michael md Goldstein at ~AMSCCSSW
TO: Sanford N. Jr. Harvey at ~PITCCN5
TO: Robert M. James at ~PITCCN2
TO: MRCULLEN@aol.com at ~AMSCCSSW
TO: Joe Quaglia at ~PITCCNC
CC: William J. O'Rourke at ~PITCCN2
Subject: Draft KC Response

---------- Message Contents ----------

Group:
Here's a draft response for Paul/Rick -- We can discuss at 2:00
K.

Paul/Rick:

Sorry for the lengthy delay in responding to your question regarding the "risk rate" in the Kidney Cancer study. (It is vacation season in the medical community) I have talked to Mark Cullen, Mike Goldstein and Harvey Checkoway to further explain why they think it is better to use the 3.5 x rate rather than the 2.5 x in our communication materials and also to give us the risk data for 0-1-3-5 years.
Essentially their thinking is:

1.) The original hypotheses was on an "ever-worked" -- "never-worked" basis -- and they both feel that is what we should report to be most credible -- (3.5 is the "ever-worked" rate). The " year-plus" (2.5 x rate) was created by Mark and Harvey for their own edification in part to determine the strength of the dose-response relationship.

And yes -- Paul you are right-- they confirmed that the ratio does come down as the exposure duration goes up.
The following is from Harvey Checkoway:
"The relative risks were estimated as Odds Ratios (OR) and are shown with their confidence intervals (95%). Except for the ever/never worked category, the results in the following table pertain to duration in high aliphatic hydrocarbon jobs, where the reference category is 1 year or less in ANY aliphatic hydrocarbon exposed jobs (high, medium or low).

Contrast			OR	(95%confidence interval)
HIGH	>0 yr (ever)	vs. never:	3.70	(1.15-11.94)
HIGH	>1 yr		2.52	(0.66- 9.66)
HIGH	>3 yr		2.29	(0.51-10.37)
HIGH	>5 yr		0.97	(0.10- 9.25)

It should be kept in mind that these results are numerically very unstable because there were only 4 cases and 6 controls who had 1+ yr of high aliphatic exposure. The pattern of decreasing relative risk with duration of high aliphatic exposure is certainly not consistent with a true dose-response relation. However, it should also be recognized that duration of employment in an exposed job, which is what these results refer to, is a very imprecise indicator of actual DOSE to hydrocarbons (this limitation of the study has been pointed out on numerous past occasions)."

I have asked Mark Cullen if we should not discuss the weak dose-response relationship in more depth in the communication materials. and he said that he did not feel we should emphasize this for the very reasons cited above, as well as the fact that the study did confirm ("rather strongly") the original hypotheses (ever-worked vs. never worked) and that is what is most important and cannot be overlooked.

They both feel that we would be leaving ourselves open to embarrassment and criticism if we use the 2.5 x rate rather than the original hypotheses (3.5 x).

As to why this all wasn't decided earlier -- the answer is -- it should have been. All of this has not slowed us down however, we have been proceeding with setting up meetings etc as per the original plan. We

will proceed with using the 3.5x rate in the communication materials unless we hear otherwise from you. (We will however make every effort to place the 3.5 in the correct context (flawed study, poor data quality, old unused processes, etc.)
Again sorry for the change and delay. I can't tell you how much we all agree that the study has consumed an enormous amount of time and energy for very little gain.

Kathy Lang (et al)

EXHIBIT

4

Author: MRCULLEN@aol.com at ~AMSCCSSW
Date: 11/11/94 2:18 PM
Priority: Normal
TO: Daniel M. Jaffe at ~PITCCN2
CC: *checko@u.washington.edu at ~AMSCCSSW
Subject: Re: Re[2]: Kidney Cancer Redux
---------- Message Contents ----------

Dear Dan
Hopefully this will get to you and Harvey at the same time. I want to expand on the roll-out process and especially, enunciate the benefits and plans which we should demonstrate at roll-out. Assumin g the study results stay roughly the same with the Tennessee adjustments, the principal benefits will be 1) confirmation that this disease, like lung and bladder, must be included in the legacy of historic problems we have to eradicate (if it hasn't been accomplished already); 2) some hints about the factors of concern CTPV and other HCs and 3) the first serious effort to explore the epid capability of Alcoa as a prelude to more and better studies in the future.

Regarding actions to be taken, there is no point in surveillance for this disease separate from surveillnace for bladder cancer- the latter is more prevalent and easier to detect early. To my knowledge there is no bladder Ca program yet. If there were, this could be piggy-backed, because the screening tests are the same basically. On the other hand, the actions which will be taken include 1) extensive sampling of CTPV and HCs throughout the company and 2) developement of an epid agenda which will focus in part of whether we have eliminated major risk for "cancers in the industry"- now expanded to include kidney, most likely.

Let me know your reaction to this. Obviously this will be a major discussion point when we look towards the future, but meantime we need to get out of the past ASAP. M

Author: hcheckoway@dehpost.sphcm.washington.edu at ~AMSCCSSW
Date: 11/14/94 11:50 AM
Priority: Normal
CC: Daniel M. Jaffe at ~PITCCN2
TO: MRCULLEN@aol.com at ~AMSCCSSW
Subject: RE: Re[2]: Kidney Cancer Redux
---------- Message Contents ----------

Mark,
This looks fine, with one possible change having to do with CTPV. The Rockette report does not specially adress CTPV or anything other than aliphatic and aromatic HCs (even though Howard intimated that he thinks the aromatics are code word for CTPV). I suggest that the action items should focus on identifying specific chemicals or classes of chemicals that relate to kidney ca risk. This would include hazard surveillance once there is a clearer understanding of potentialy causative agents.
-H

To: jaffe01@ssw.alcoa.com
Cc: checko@u.washington.edu
From: MRCULLEN@aol.com on Fri, Nov 11, 1994 10:30 AM
Subject: Re: Re[2]: Kidney Cancer Redux
RFC Header:Received: by dehpost.sphcm.washington.edu with SMTP;11 Nov 1994 10:30:31 -0800
Received: from mail02.mail.aol.com by mx5.u.washington.edu
(5.65+UW94.10/UW-NDC Revision: 2.31) id AA15024;
Fri, 11 Nov 94 10:27:42 -0800
Received: by mail02.mail.aol.com
(1.38.193.5/16.2) id AA26607; Fri, 11 Nov 1994 13:27:42 -0500
Date: Fri, 11 Nov 1994 13:27:42 -0500
From: MRCULLEN@aol.com
Message-Id: <941111132738_5541894@aol.com>
To: jaffe01@ssw.alcoa.com
Cc: checko@u.washington.edu
Subject: Re: Re[2]: Kidney Cancer Redux

Dear Dan
Hopefully this will get to you and Harvey at the same time. I want to expand on the roll-out process and especially, enunciate the benefits and plans which we should demonstrate at roll-out. Assumin g the study results stay roughly the same with the Tennessee adjustments, the principal benefits will be 1) confirmation that this disease, like lung and bladder, must be included in the legacy of historic problems we have to eradicate (if it hasn't been accomplished already); 2) some hints about the factors of concern CTPV and other HCs and 3) the first serious effort to explore the epid capability of Alcoa as a prelude to more and better studies in the future.

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Let me know your reaction to this. Obviously this will be a major discussion point when we look towards the future, but meantime we need to get out of the past ASAP. M

EXHIBIT

5

PROPORTIONATE MORTALITY STUDY

OF ALCOA WORKERS

(1980-1987)

Tele. ACOA
Mortality

PROPORTIONATE MORTALITY STUDY

OF ALCOA WORKERS

(1980-1987)

Howard E. Rockette, Ph.D.
Department of Biostatistics
University of Pittsburgh

Vincent C. Arena, Ph.D.
Department of Clinical Epidemiology
and Preventive Medicine
University of Pittsburgh

MARCH 1990

Acknowledgements - The authors wish to acknowledge Mrs. Bonnie Besseck for coding the death certificates, Mr. Rao Damaraju, Ms. Cora Wixey for coding employment histories and help in preparing the report, and Mrs. Betty Valentine for typing the manuscript. We would also like to thank Ms. Barbara Peterson for her diligence in obtaining the death certificates.

Background

This study provides an evaluation of the mortality patterns of workers in the aluminum industry that can be used with the information from the previously reported Tripartite Study to help assess potential health problems in the aluminum industry. The Tripartite Study was initiated in May 1978 and a report of study findings was made in November 1981. Progress of the study was reported quarterly throughout the duration of the contract period to a Tripartite Committee consisting of representatives of labor, management and government. The study population consisted of 21,829 men employed at least five years in a reduction operation in one of the 14 plants between January 1, 1946 and December 31, 1973 (1). Vital Status determination as of December 31, 1977 was made on 99.3% of the cohort and death certificates were obtained for 97.6% of the men believed to be deceased. The priorities which directed the analysis of the Tripartite data were as follows:

(1) Mortality patterns of workers in the potroom and/or carbon departments were given the most attention in the analysis.

(2) Respiratory cancer was to be investigated thoroughly and was the disease category given the highest priority.

(3) Lymphopoietic cancers were to be investigated and were second only to respiratory cancer as a disease category to be given special attention.

(4) For diseases other than respiratory cancer and lymphopoietic cancer, enough preliminary analysis was

done to identify any excess mortality that was associated with a particular plant or process.

(5) Causes of death associated with the aluminum reduction process in other studies were reinvestigated using the Tripartite data.

In order to satisfy these objectives, the mortality patterns of employees in the fourteen reduction plants was compared to the total U.S. male population for 59 selected causes of death. Analysis was done by plant, process, calendar time period, time since first employment and selected exposure measurements. Industrial hygiene measurements were available for total particulates, benzene solubles, benzo(a)pyrene, particulate polycyclic organic matter, sulfur dioxide and total fluorides. Based on these analyses and the previous research literature on mortality of reduction plant workers, some categories of disease were selected for more detailed investigation.

The major findings of the Tripartite Study were as follows:

(1) There were no strong associations of lung cancer mortality and work in the reduction plant. Overall the lung cancer SMR of the total cohort based on 272 observed deaths was 96.4. Formal tests of a dose-response relationship to cumulative years employment in the potroom and carbon departments, cumulative years of employment in the reduction plant, and cumulative exposure to benzene solubles, particulate polycyclic organic matter, benzo(a)pyrene, total particulates, total fluorides and sulfur dioxide showed no statistically significant relationship.

There were two exceptions to the lack of an excess for lung cancer mortality. One plant, a horizontal Soderberg, had an SMR of 162.0 ($p<0.05$) for white males. However, the region in which the plant was located has a high lung cancer rate in the general population and when the data was reanalyzed using local rates, the SMR was below 100. The second excess was in the baked carbon department of one of the plants where there was an SMR of 266.8 ($p<0.05$) based on eight observed deaths. However, this excess was not observed in the baked carbon departments of the remainder of the prebake plants.

(2) The SMR for leukemia was 124.9 based on 43 observed deaths. This excess was not statistically significant. The SMR for the prebake process was 123.5 and for the Soderberg process was 130.2. The SMR for potroom workers in the Soderberg process was 169.1 and for potroom workers in the prebake process was 124.6. Analysis by duration of employment was not consistent by process with men in the prebake showing more excess with longer term employment and men in the Soderberg process showing greater excess with short term employment.

(3) The SMR for pancreatic cancer was 122.3 and was not statistically significant. However, there was a significant excess for men with more than 15 years employment in the potroom department in both the Soderberg (SMR=271.3, $p<0.05$) and prebake process (SMR=222.2, $p<0.05$).

(4) The SMR for kidney cancer in the prebake process was 144.9. The excess was greater in men with less than 20 years employment and greater in men employed outside the carbon and potroom departments.

(5) Although the number of observed deaths was small there was an excess of bladder cancer in men employed 5 or more years in the potroom or carbon department of the Soderberg process.

(6) The only cause of death which was statistically elevated for an entire process was benign and unspecified neoplasms. For the prebake process the SMR for this cause was 193.5 ($p<0.05$) based on 14 observed deaths. The estimated risk was greater for men employed twenty-five or more years, and was higher outside the potroom and carbon departments.

(7) There was an excess of emphysema in the potroom and carbon departments of the Soderberg process (SMR=216.5, $p<0.05$; SMR=258.9, $p<0.05$). Although the excess in the prebake process was elevated, it was not statistically significant. The emphysema risk may have been understated in the prebake process because of a tendency to code many death certificates to "chronic obstructive lung disease" after 1970. If these cases were considered to be emphysema there would be a statistically significant excess in the prebake process. For men with more than 20 years employment in the prebake process there was an SMR of 260.2, ($p<0.01$) for asthma.

The present study is a PMR Study without detailed work histories and without exposure measurements available. Thus, the conclusions that can be drawn from this study are more limited than those that could be obtained from the Tripartite Study. Nevertheless, this study provides us with an independent data base on which to confirm the interpretation of some of the findings in the Tripartite Study and also provides a means of

obtaining a preliminary evaluation of mortality patterns of nonreduction plant workers. Specifically, the primary objectives of the present study are as follows:

(1) To obtain mortality data from aluminum reduction plants independent of the Tripartite cohort that can be used to further clarify the relationship of employment in aluminum reduction plants to excess mortality from cancer. Because the majority of ALCOA workers were employed in the prebake process, it is for workers in this process that we expect the most information to be obtained. The mortality patterns in the PMR study will be contrasted with those obtained from the Tripartite Study.

(2) To obtain a profile of the mortality experience of nonreduction plant workers. Little information is available on the mortality experience of nonreduction plant workers since most studies have focussed on exposure in the potroom and carbon departments. This part of the investigation is limited because of the lack of detailed coding within the nonreduction plants. However, by investigating the consistency of any excess among plants with similar processes we may identify potential associations for future investigation.

(3) On the basis of this PMR study, the Tripartite Study and a review of the literature of potential health hazards in the aluminum industry, we will make specific recommendations of studies we feel are necessary in order to determine the association of disease with exposure in the aluminum industry. Such studies will be primarily hypotheses testing as opposed to hypothesis generating.

Methods

The study population assembled by ALCOA consisted of all deaths known to the company as determined by insurance claims during the time period 1/1/80 through 12/31/87 in one of the 37 study plants. Any former employee whose beneficiary had either filed a claim or was receiving death benefits from the company was included in the study population. The initial list supplied by ALCOA was reviewed for duplicates and incomplete or inconsistent names. The resultant study population contains 6433 workers. Death certificates were obtained for all but 60 (0.9%) of the study population. These deaths were coded by a nosologist according to the ninth revision ICD and it is these 6373 death certificates on which the analyses in the present report are based. The frequencies of deaths for each cause are given in the Appendix.

Detailed work histories were not coded and analyzed for this study, since to provide such coding for such a large variety of plants and processes would have required considerable effort. For this report an employee was classified in the plant where he was last employed. Using this method of classification, 2777 workers were coded to one of the eight reduction plants. For these eight reduction plants we further coded whether they had ever worked in the potroom or carbon department as well as the department they spent the majority of time. Nine employees could not be included in this analysis because we did not have work histories. The departments in the reduction process used to classify majority of time were potroom, carbon, ingot, mechanical maintenance, electrical maintenance, and power. A total of 1320

employees in the eight reduction plants spent the majority of their time in a nonreduction process. We have done analysis separately for the 3596 employees in nonreduction plants, the 1320 employees in a nonreduction process of a reduction plant and the 1448 employees in the reduction process.

The proportionate mortality ratio was the primary summary index of risk. The analysis was done using the computer program OCMAP (2) and five year average annual age, race and sex-specific U.S. rates for the control group. As a secondary analysis we used a proportionate cancer mortality index (PCMR) (3). This index uses "all cancer mortality" as the base on which to base proportionate mortality rather than "all cause" mortality and is believed by many investigators to be less subject to the healthy worker effect.

Both the PMR and PCMR were adjusted for age, sex, race and calendar time. To meet the primary objectives of this study we completed the following analyses:

(1) The PMR and PCMRs were computed for 62 selected causes of death by race, sex, and race-sex combinations for the total cohort, for nonreduction plants, and for plants with a reduction process (reduction plants).

(2) For plants with a reduction process PMRs and PCMRs were computed for employees with a majority of their time in each of the following: a) nonreduction process, b) potroom department, c) carbon department, d) ingot department, e) mechanical maintenance, f) electrical maintenance, and g) power. Mortality indices were also

computed for employees "ever employed in the potroom department" and employees "ever employed in the carbon department".

(3) PMRs and PCMRs were computed for each plant for all 62 selected causes of death.

Because of the large number of comparisons we expect some statistically significant excesses as well as deficits. When interpreting our data we will give emphasis to the excesses, but when interpreting excesses we will take into consideration the consistency of the result with the Tripartite Study as well as the consistency with other plants that have a similar process. In most cases we have required that either the observed or expected number of deaths be 5 before we attempt to interpret results for a specific cause of death.

Population Characteristics

A total of 6373 death certificates was obtained and coded for the years 1980 to 1987 in the 37 study plants. A total of 6112 (95.9%) death certificates were for males and 5816 (91.3%) were for whites. Table 1 summarizes the distribution of deaths by year. The number of deaths were approximately equal for each of the seven years of the study. The age at death is summarized in Table 2. Fifty-one percent of the deaths occurred at ages 65-79.

The distribution of deaths for the 37 study plants is shown in Table 3. The eight plants with a reduction process contributed 44% of the total deaths and 28% of the total deaths were for employees who at one time were in a reduction process evaluated in the Tripartite Study. Of the 2777 workers in one

of the eight plants with a reduction process, all but 9 had employment histories. Of the 2768 workers with employment histories, 1320 spent the majority of their time in a nonreduction process. The distribution of the number of employees spending the majority of their time in a specific reduction department is given in Table 4. Of the 1448 employees with the majority of time in one of the reduction departments, 556 (36%) had the majority of their time in the potroom. The second largest group was mechanical maintenance which accounted for 433 (29.9%) of the deaths.

Table 1

Distribution of Employees
by Year of Death

Year	Frequency	Percent
1980	766	12.0
1981	772	12.1
1982	781	12.3
1983	824	12.9
1984	793	12.4
1985	759	11.9
1986	819	12.9
1987	859	13.5
TOTAL	6373	100.0

Table 2
Distribution of Employees
by Age at Death

Value Label	Frequency	Percent
20 - 24	7	.1
25 - 29	19	.3
30 - 34	29	.5
35 - 39	41	.6
40 - 44	57	.9
45 - 49	80	1.3
50 - 54	172	2.7
55 - 59	293	4.6
60 - 64	573	9.0
65 - 69	1002	15.7
70 - 74	1261	19.8
75 - 79	1182	18.5
80 - 84	838	13.1
85 - 89	541	8.5
90 - 94	206	3.2
≥95	72	1.1

Table 3

Distribution of Workers by Plant

Plant Name	Frequency	Percent
Tennessee	1325	20.8
Vernon	210	3.3
Point Comfort	167	2.6
Massena	630	9.9
New Kensington	754	11.8
Cleveland	448	7.0
Cressona	231	3.6
Buffalo	7	.1
Vancouver	196	3.1
Warrick	116	1.8
Chillicothe	54	.8
Richmond	74	1.2
Detroit	76	1.2
East St. Louis	145	2.3
Edgewater	282	4.4
Chicago	27	.4
Corona	12	.2
Bridgeport	36	.6
Edison	103	1.6
Davenport	247	3.9
Wentachee	88	1.4
Lafayette	355	5.6
Lancaster	31	.5
Marshall	11	.2
Logans Ferry	16	.3
Mobile	149	2.3
Lebanon	8	.1
Anderson	2	.0
Badin	152	2.4
Bauxite	148	2.3
Addy	8	.1
Atc	89	1.4
Fort Meade	4	.1
Franklin	23	.4
Rockdale	103	1.6
Rosiclare	36	.6
Tiffon	10	.2
Total	6373	100.0

Table 4
Department Where Reduction Plant Workers
Spent Majority of Time

Department	Frequency	Percent
Potroom	556	38.4
Carbon	140	9.7
Ingot	183	12.6
Mech Maintenance	433	29.9
Elec Maintenance	113	7.8
Power	23	1.6

Results

A. Mortality for Total Cohort

The cause-specific mortality for 62 selected causes of death is shown in Table 5. The PMR for the category "all malignant neoplasms" is 103.7 based on 1605 observed deaths. Five causes of death are significantly elevated. These are cancer of the kidney (PMR=158.1, $p<0.01$), all other malignant neoplasms (PMR=134.3, $p<0.01$), benign and unspecified neoplasms (PMR=195.6, $p<0.01$), nephritis and nephrosis (PMR=242.2, $p<0.01$) and cerebral vascular disease (PMR=111.4, $p<0.05$). Since males comprise 91% of the cohort, it is not surprising that when we restrict our analysis to the population of males (Table 6) the same causes of death show a significant excess. For females (Table 7), all other malignant neoplasms (PMR=240.2, $p<0.01$), benign neoplasms (PMR=600.5, $p<0.01$) and all other causes of death (PMR=135.1, $p<0.05$) show a statistically significant excess.

When mortality patterns for the total cohort are

Table 5
Observed and Expected Deaths and Proportionate Mortality Ratios for the Total Population

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	8373	8373.00	100.0		---	---
Tuberculosis	4	8.15	49.0		13.7	127.8
All Malignant Neoplasms	1606	1548.32	103.7		99.4	108.1
Cancer of Buccal Cavity & Pharynx	18	33.66	53.6	**	34.1	84.4
Cancer of Digestive Organs & Peritoneum	365	361.60	100.9		91.5	111.1
Cancer of Esophagus	19	28.85	51.8	**	33.2	80.0
Cancer of Stomach	89	83.88	109.5		84.9	141.2
Cancer of Large Intestine	168	151.98	109.2		94.0	128.9
Cancer of Rectum	30	29.70	101.0		70.7	144.3
Cancer of Biliary Passages & Liver	30	34.79	88.2		60.4	123.2
Cancer of Pancreas	74	75.10	98.5		78.6	123.8
Cancer of All Other Digestive Organs	7	10.95	63.9		30.7	139.2
Cancer of Respiratory System	568	545.75	104.1		96.3	112.5
Cancer of Larynx	7	17.69	39.1	*	19.2	79.8
Cancer of Bronchus, Trachea, Lung	558	522.98	106.7		98.8	116.4
Cancer of All Other Respiratory	3	4.88	61.5		20.1	185.5
Cancer of Breast	13	14.29	91.0		53.8	183.9
All Uterine Cancers (Females only)	4	3.23	123.8		46.9	328.6
Cancer of Cervix Uteri (Females only)	1	1.33	75.2		10.6	524.4
Cancer of Other Female Genital Organs	1	4.17	95.9		36.4	292.9
Cancer of Prostate (Males only)	147	167.88	87.5		74.7	102.5
Cancer of Testes and Other Male Genital Organs	3	2.46	121.9		39.4	377.1
Cancer of Kidney	53	33.62	156.1	**	121.2	206.9
Cancer of Bladder and Other Urinary Organs	48	46.32	103.5		78.2	137.4
Malignant Melanoma of Skin	19	16.88	112.8		71.8	178.2
Cancer of Eye	1	0.79	127.3		18.0	699.0
Cancer of Central Nervous System	24	29.12	82.4		55.9	122.7
Cancer of Thyroid & Other Endocrine Glands	4	3.42	118.9		43.9	311.1
Cancer of Bone	3	2.50	120.0		38.8	371.3
Cancer of All Lymphatic, Haematopoietic Tissue	147	129.48	113.8		96.8	133.2
Lymphosarcoma & Reticulosarcoma	18	13.74	118.5		71.4	188.8
Hodgkins Disease	7	4.76	146.8		70.2	305.9
Leukemia & Aleukemia	55	53.81	102.0		78.4	132.7
Cancer of All Other Lymphopoietic Tissue	68	57.03	121.0		95.7	153.0
All Other Malignant Neoplasms	164	122.11	134.3	**	115.5	156.2
Benign Neoplasms	29	14.82	195.6	**	136.9	279.5
Diabetes Mellitus	92	83.41	98.4		78.7	118.1
Cerebrovascular Disease	466	418.26	111.4	*	102.1	121.8
All Heart Disease	2585	2587.57	99.5		95.8	102.5
Rheumatic Heart Disease	14	22.91	61.4		38.9	103.0
Ischemic Heart Disease	1989	2217.38	88.2	**	82.2	88.3
Chronic Endocard. Dis.; Other Myocard. Insuff.	134	125.14	107.1		90.8	126.8
Hypertension with Heart Disease	52	62.35	83.4		63.7	109.2
All Other Heart Disease	406	401.07	100.9		92.5	110.1
Hypertension w/o Heart Disease	23	17.23	133.5		89.9	200.5
Non-malignant Respiratory Disease	482	560.91	82.4	**	76.6	89.8
Influenza & Pneumonia	153	198.70	77.0	**	66.0	89.9
Bronchitis, Emphysema, Asthma	73	88.50	82.5		65.7	103.5
Bronchitis	10	15.63	64.4		34.8	119.0
Emphysema	54	69.12	78.3		60.9	103.3
Asthma	9	5.60	160.3		81.2	298.8
Other Non-malignant Respiratory Disease	236	287.62	82.1	**	72.8	92.9
Ulcer of Stomach & Duodenum	22	19.09	115.2		76.0	174.8
Cirrhosis of Liver	56	90.49	61.9	**	47.9	80.0
Nephritis & Nephrosis	85	35.09	242.2	**	197.3	297.4
All External Causes of Death	286	285.29	100.9		90.9	112.1
Accidents	191	170.11	108.6		93.2	122.1
Motor Vehicle Accidents	80	69.83	115.1		92.2	142.0
All Other Accidents	111	111.10	99.9		83.2	120.0
Suicides	74	72.56	102.0		81.0	127.8
Homicides & Other External Causes	23	33.02	69.4		46.2	101.3
All Other Causes of Death	886	851.81	105.3		98.1	113.0
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 6
Observed and Expected Deaths and Proportionate Mortality Ratios for Males

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	6112	6112.00	100.0		---	---
Tuberculosis	4	7.98	50.1		19.2	130.8
All Malignant Neoplasms	1533	1482.52	103.4		98.9	108.0
Cancer of Buccal Cavity & Pharynx	16	32.68	58.1	*	35.0	86.7
Cancer of Digestive Organs & Peritoneum	387	385.81	100.4		90.9	110.8
Cancer of Esophagus	19	36.20	52.5	**	33.8	81.5
Cancer of Stomach	87	82.24	108.1		84.3	141.3
Cancer of Large Intestine	158	144.84	107.9		92.4	126.0
Cancer of Rectum	29	28.48	101.8		70.3	148.4
Cancer of Biliary Passages & Liver	28	33.15	84.5		58.4	122.2
Cancer of Pancreas	71	71.57	99.2		78.7	125.0
Cancer of All Other Digestive Organs	7	10.40	67.3		32.3	140.4
Cancer of Respiratory System	557	533.38	104.4		96.6	113.0
Cancer of Larynx	7	17.68	39.6	*	19.4	80.8
Cancer of Bronchus, Trachea, Lung	547	510.87	107.1		98.9	116.9
Cancer of All Other Respiratory	3	4.73	63.4		20.6	184.6
Cancer of Breast	0	1.63	---		---	---
All Uterine Cancers (Females only)	0	0.00	---		---	---
Cancer of Cervix Uteri (Females only)	0	0.00	---		---	---
Cancer of Other Female Genital Organs	0	0.00	---		---	---
Cancer of Prostate (Males only)	147	167.88	87.5		74.7	102.8
Cancer of Testes and Other Male Genital Organs	3	2.48	121.0		39.4	377.1
Cancer of Kidney	53	32.42	163.5	**	125.3	213.3
Cancer of Bladder and Other Urinary Organs	48	45.39	105.7		79.8	140.2
Malignant Melanoma of Skin	19	16.19	117.4		75.0	183.7
Cancer of Eye	1	0.74	134.5		19.1	948.2
Cancer of Central Nervous System	21	27.66	75.9		49.6	116.1
Cancer of Thyroid & Other Endocrine Glands	4	3.18	126.5		47.6	338.2
Cancer of Bone	3	2.38	126.0		40.7	389.2
Cancer of All Lymphatic, Haematopoietic Tissue	141	123.61	114.1		96.8	134.3
Lymphosarcoma & Reticulosarcoma	19	13.03	122.8		78.3	200.1
Hodgkins Disease	7	4.55	153.9		73.8	320.8
Leukemia & Aleukemia	53	51.71	102.5		78.4	134.0
Cancer of All Other Lymphopoietic Tissue	65	54.32	119.7		94.0	152.4
All Other Malignant Neoplasms	151	116.70	129.4	**	110.5	151.5
Benign Neoplasms	24	13.98	171.5	**	115.6	254.8
Diabetes Mellitus	88	89.58	84.8		78.9	117.2
Cerebrovascular Disease	446	394.33	113.1	**	103.4	123.7
All Heart Disease	2467	2469.77	99.9		96.9	103.0
Rheumatic Heart Disease	13	20.60	62.7		37.7	109.1
Ischemic Heart Disease	1823	2137.37	85.3	**	82.2	88.5
Chronic Endocard. Dis.; Other Myocard. Insuff.	128	119.10	107.5		90.6	127.5
Hypertension With Heart Disease	62	69.04	88.1		67.2	115.4
All Other Heart Disease	451	443.05	101.7		93.1	111.2
Hypertension w/o Heart Disease	22	18.41	134.1		88.5	203.2
Non-malignant Respiratory Disease	481	543.17	82.0	**	76.1	90.6
Influenza & Pneumonia	149	180.83	78.1	**	66.8	91.3
Bronchitis, Emphysema, Asthma	72	88.91	53.8		66.7	105.4
Bronchitis	10	15.04	66.5		36.0	122.9
Emphysema	52	66.54	78.7		61.0	104.0
Asthma	9	6.38	188.1		88.1	320.8
Other Non-malignant Respiratory Disease	230	279.79	82.2	**	72.8	93.2
Ulcer of Stomach & Duodenum	20	18.28	109.3		70.6	169.4
Cirrhosis of Liver	56	87.23	63.1	**	48.7	81.7
Nephritis & Nephrosis	82	33.71	243.2	**	197.4	299.7
All External Causes of Death	278	275.84	100.9		90.7	112.3
Accidents	184	172.47	106.7		93.0	122.4
Motor Vehicle Accidents	75	68.67	112.5		90.5	139.9
All Other Accidents	109	107.26	101.6		84.5	122.2
Suicides	71	70.79	100.3		79.8	126.0
Homicides & Other External Causes	23	32.29	71.2		48.1	105.6
All Other Causes of Death	648	621.28	103.8		96.5	111.7
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 7
Observed and Expected Deaths and Proportionate Mortality Ratios for Females

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	261	261.00	100.0		---	---
Tuberculosis	0	0.20	---		---	---
All Malignant Neoplasms	72	65.80	109.4		80.3	132.8
Cancer of Buccal Cavity & Pharynx	0	0.87	---		---	---
Cancer of Digestive Organs & Peritoneum	18	16.19	111.2		71.2	173.7
Cancer of Esophagus	0	0.85	---		---	---
Cancer of Stomach	2	1.64	122.2		30.8	485.9
Cancer of Large Intestine	10	7.44	134.4		73.2	248.9
Cancer of Rectum	1	1.22	81.8		11.8	575.7
Cancer of Biliary Passages & Liver	2	1.64	121.7		30.8	483.2
Cancer of Pancreas	3	3.53	84.9		27.7	260.7
Cancer of All Other Digestive Organs	0	0.55	---		---	---
Cancer of Respiratory System	11	12.36	89.0		50.9	157.2
Cancer of Larynx	0	0.22	---		---	---
Cancer of Bronchus, Trachea, Lung	11	12.00	91.6		51.8	182.1
Cancer of All Other Respiratory	0	0.14	---		---	---
Cancer of Breast	13	12.66	102.7		60.9	173.2
All Uterine Cancers (Females only)	4	3.23	123.8		46.9	326.6
Cancer of Cervix Uteri (Females only)	1	1.33	75.2		10.8	524.4
Cancer of Other Female Genital Organs	4	4.17	95.8		36.4	252.9
Cancer of Prostate (Males only)	0	0.00	---		---	---
Cancer of Testes and Other Male Genital Organs	0	0.00	---		---	---
Cancer of Kidney	0	1.10	---		---	---
Cancer of Bladder and Other Urinary Organs	0	0.93	---		---	---
Malignant Melanoma of Skin	0	0.69	---		---	---
Cancer of Eye	0	0.04	---		---	---
Cancer of Central Nervous System	3	1.46	206.4		66.2	616.7
Cancer of Thyroid & Other Endocrine Glands	0	0.26	---		---	---
Cancer of Bone	0	0.12	---		---	---
Cancer of All Lymphatic, Haematopoietic Tissue	6	5.84	102.8		46.8	226.4
Lymphosarcoma & Reticulosarcoma	0	0.70	---		---	---
Hodgkins Disease	0	0.23	---		---	---
Leukemia & Aleukemia	2	2.20	90.8		22.9	360.8
Cancer of All Other Lymphopoietic Tissue	4	2.70	147.9		58.2	388.4
All Other Malignant Neoplasms	13	5.41	240.2	**	142.7	404.2
Benign Neoplasms	5	0.83	600.5	**	278.8	1294.5
Diabetes Mellitus	7	5.88	119.5		57.5	248.3
Cerebrovascular Disease	20	23.93	83.6		55.2	126.4
All Heart Disease	88	97.80	90.0		76.5	105.8
Rheumatic Heart Disease	1	2.41	41.6		6.3	274.4
Ischemic Heart Disease	66	79.90	82.6		67.8	100.6
Chronic Endocard. Dis.; Other Myocard. Insuff.	6	6.04	99.4		45.2	218.5
Hypertension with Heart Disease	0	2.32	---		---	---
All Other Heart Disease	15	16.32	91.9		50.4	133.1
Hypertension w/o Heart Disease	1	0.82	121.8		17.9	859.8
Non-malignant Respiratory Disease	11	17.74	62.0		35.3	108.0
Influenza & Pneumonia	4	7.97	50.8		19.8	130.4
Bronchitis, Emphysema, Asthma	1	2.59	38.7		5.9	252.8
Bronchitis	0	0.48	---		---	---
Emphysema	1	1.58	63.4		9.2	438.2
Asthma	0	0.44	---		---	---
Other Non-malignant Respiratory Disease	6	7.84	76.5		34.9	167.8
Ulcer of Stomach & Duodenum	2	0.80	250.3		66.6	882.6
Cirrhosis of Liver	1	3.27	30.6		4.9	180.4
Nephritis & Nephrosis	3	1.38	217.5		72.5	684.7
All External Causes of Death	10	9.75	102.6		56.2	180.7
Accidents	7	6.64	105.3		52.0	213.4
Motor Vehicle Accidents	5	2.87	174.4		76.9	395.7
All Other Accidents	2	0.89	52.3		13.6	201.1
Suicides	3	1.77	169.6		56.5	503.7
Homicides & Other External Causes	0	1.34	---		---	---
All Other Causes of Death	41	30.34	135.1	*	101.5	179.9
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 8
Observed and Expected Deaths and Proportionate Mortality Ratios for Whites

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	5818	5810.00	100.0		---	---
Tuberculosis	3	5.88	50.3		16.8	152.5
All Malignant Neoplasms	1438	1407.48	102.2		97.7	108.8
Cancer of Buccal Cavity & Pharynx	13	29.89	43.8	**	28.7	73.8
Cancer of Digestive Organs & Peritoneum	340	344.43	98.7		89.1	109.4
Cancer of Esophagus	17	30.81	55.7	*	34.9	88.9
Cancer of Stomach	48	46.47	89.0		74.2	132.0
Cancer of Large Intestine	153	140.84	108.8		92.9	127.0
Cancer of Rectum	29	27.80	105.1		73.1	151.1
Cancer of Biliary Passages & Liver	22	30.89	71.2		47.0	107.8
Cancer of Pancreas	66	68.29	98.7		78.0	122.8
Cancer of All Other Digestive Organs	7	10.17	68.8		33.0	142.7
Cancer of Respiratory System	520	499.48	104.1		96.0	112.8
Cancer of Larynx	7	15.91	44.0	*	21.4	80.3
Cancer of Bronchus, Trachea, Lung	510	479.07	106.5		98.0	115.8
Cancer of All Other Respiratory	3	4.49	66.8		21.7	205.3
Cancer of Breast	13	13.67	95.1		56.2	180.8
All Uterine Cancers (Females only)	3	3.04	98.8		32.2	303.6
Cancer of Cervix Uteri (Females only)	0	1.18	---		---	---
Cancer of Other Female Genital Organs	4	4.09	97.8		37.1	267.7
Cancer of Prostate (Males only)	123	143.48	85.7		72.0	102.0
Cancer of Testes and Other Male Genital Organs	3	2.23	134.8		43.7	418.0
Cancer of Kidney	48	31.86	162.1	**	118.0	201.3
Cancer of Bladder and Other Urinary Organs	44	43.58	101.0		75.3	135.8
Malignant Melanoma of Skin	16	16.65	108.1		68.2	171.4
Cancer of Eye	1	0.77	129.9		18.4	817.0
Cancer of Central Nervous System	22	28.05	78.4		51.8	116.8
Cancer of Thyroid & Other Endocrine Glands	4	3.22	124.2		48.7	330.2
Cancer of Bone	3	2.31	130.0		42.1	401.8
Cancer of All Lymphatic, Haematopoietic Tissue	132	120.86	109.5		92.5	129.8
Lymphosarcoma & Reticulosarcoma	13	13.13	99.0		57.5	170.4
Hodgkins Disease	7	4.61	155.1		74.4	323.3
Leukemia & Aleukemia	50	50.68	98.7		74.9	130.0
Cancer of All Other Lymphopoietic Tissue	62	52.26	118.8		92.6	152.0
All Other Malignant Neoplasms	147	110.55	133.0	**	113.4	156.0
Benign Neoplasms	26	13.80	191.2	**	131.1	276.8
Diabetes Mellitus	73	84.63	86.3		68.7	108.3
Cerebrovascular Disease	422	373.12	113.1	**	103.2	124.0
All Heart Disease	2371	2371.78	100.0		96.0	103.1
Rheumatic Heart Disease	14	21.75	64.4		38.3	108.1
Ischaemic Heart Disease	1777	2082.38	85.3	**	82.2	88.6
Chronic Endocard. Dis.; Other Myocard. Insuff.	128	113.69	112.4		94.7	133.4
Hypertension with Heart Disease	36	49.83	72.6		52.5	100.3
All Other Heart Disease	416	405.99	102.5		93.4	112.4
Hypertension w/o Heart Disease	20	14.42	138.7		89.7	214.4
Non-malignant Respiratory Disease	430	521.14	82.5	**	75.4	90.3
Influenza & Pneumonia	143	180.38	79.3	**	67.6	93.0
Bronchitis, Emphysema, Asthma	68	63.92	81.0		64.0	102.6
Bronchitis	10	14.87	67.2		36.3	124.3
Emphysema	50	55.12	76.8		58.3	101.1
Asthma	8	6.02	159.4		80.2	316.8
Other Non-malignant Respiratory Disease	219	288.47	81.3	**	71.4	92.4
Ulcer of Stomach & Duodenum	21	17.56	119.6		78.0	185.1
Cirrhosis of Liver	50	83.04	60.2	**	45.9	78.9
Nephritis & Nephrosis	75	29.88	251.0	**	201.8	312.1
All External Causes of Death	261	255.72	102.1		91.4	114.0
Accidents	174	160.98	108.1		93.8	124.8
Motor Vehicle Accidents	70	63.51	110.2		86.0	138.0
All Other Accidents	104	98.79	105.3		87.2	127.2
Suicides	70	70.11	99.8		78.4	125.8
Homicides & Other External Causes	17	24.65	69.0		43.4	109.5
All Other Causes of Death	928	583.52	107.3		99.8	115.5

Unknown Causes (In All Causes Category Only) 0

* Significant at 5% Level; ** Significant at 1% Level

Table 9
Observed and Expected Deaths and Proportionate Mortality Ratios for Nonwhites

Cause of Death (ICDA 8th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	557	557.00	100.0		---	---
Tuberculosis	1	2.22	45.1		6.7	302.8
All Malignant Neoplasms	107	140.88	118.5	*	104.1	135.0
Cancer of Buccal Cavity & Pharynx	5	3.86	138.8		57.3	326.8
Cancer of Digestive Organs & Peritoneum	48	37.37	120.4		90.8	159.5
Cancer of Esophagus	2	8.34	31.8		8.8	116.0
Cancer of Stomach	13	7.41	175.5	*	103.0	289.1
Cancer of Large Intestine	13	11.15	118.8		68.1	199.6
Cancer of Rectum	1	2.11	47.8		7.0	321.2
Cancer of Biliary Passages & Liver	5	2.80	205.1	*	104.4	403.1
Cancer of Pancreas	4	6.81	117.4		59.0	233.8
Cancer of All Other Digestive Organs	0	0.79	---		---	---
Cancer of Respiratory System	45	46.27	103.7		78.3	135.7
Cancer of Larynx	0	1.98	---		---	---
Cancer of Bronchus, Trachea, Lung	45	45.80	109.3		83.8	143.1
Cancer of All Other Respiratory	0	0.38	---		---	---
Cancer of Breast	0	0.82	---		---	---
All Uterine Cancers (Females only)	1	0.19	513.2		90.8	2808.8
Cancer of Cervix Uteri (Females only)	1	0.14	697.7	*	132.1	3885.8
Cancer of Other Female Genital Organs	0	0.06	---		---	---
Cancer of Prostate (Males only)	24	24.45	98.0		68.4	144.7
Cancer of Testes and Other Male Genital Organs	0	0.24	---		---	---
Cancer of Kidney	5	1.98	254.5	*	108.8	591.9
Cancer of Bladder and Other Urinary Organs	4	2.76	145.0		54.9	383.2
Malignant Melanoma of Skin	1	0.23	435.8		72.5	2818.7
Cancer of Eye	0	0.02	---		---	---
Cancer of Central Nervous System	2	1.07	187.0		47.9	728.9
Cancer of Thyroid & Other Endocrine Glands	0	0.20	---		---	---
Cancer of Bone	0	0.19	---		---	---
Cancer of All Lymphatic, Haematopoietic Tissue	15	8.87	169.2	*	103.0	277.9
Lymphosarcoma & Reticulosarcoma	3	0.81	495.0	**	178.7	1371.1
Hodgkins Disease	0	0.26	---		---	---
Leukemia & Aleukemia	5	3.23	154.9		85.1	388.8
Cancer of All Other Lymphopoietic Tissue	7	4.77	146.8		70.5	205.5
All Other Malignant Neoplasms	17	11.56	147.1		92.2	234.7
Benign Neoplasms	3	1.22	245.3		82.2	732.1
Diabetes Mellitus	19	10.79	176.1	*	113.5	273.2
Cerebrovascular Disease	44	48.14	87.8		73.5	128.3
All Heart Disease	184	185.77	84.0		83.7	105.5
Rheumatic Heart Disease	0	1.07	---		---	---
Ischemic Heart Disease	112	134.82	83.0	*	70.7	97.4
Chronic Endocard. Dis.; Other Myocard. Insuff.	8	11.28	83.3		24.5	116.1
Hypertension with Heart Disease	18	12.72	125.5		77.8	203.9
All Other Heart Disease	50	55.68	89.8		69.1	118.8
Hypertension w/o Heart Disease	3	2.80	107.0		34.8	330.7
Non-malignant Respiratory Disease	32	28.77	80.8		57.7	112.2
Influenza & Pneumonia	10	18.32	54.6	*	30.0	98.3
Bronchitis, Emphysema, Asthma	5	4.87	109.3		45.7	261.8
Bronchitis	0	0.66	---		---	---
Emphysema	4	3.00	133.4		50.4	383.2
Asthma	1	0.78	128.8		18.2	905.1
Other Non-malignant Respiratory Disease	17	15.15	93.8		58.7	149.4
Ulcer of Stomach & Duodenum	1	1.52	65.8		9.4	467.8
Cirrhosis of Liver	5	7.45	80.5		38.8	178.8
Nephritis & Nephrosis	10	5.21	192.1	*	104.8	882.0
All External Causes of Death	27	29.57	91.3		66.5	128.7
Accidents	17	18.15	93.7		59.1	148.5
Motor Vehicle Accidents	10	5.02	166.0		80.5	303.3
All Other Accidents	7	12.31	56.9		27.7	116.8
Suicides	4	2.45	163.6		62.6	427.7
Homicides & Other External Causes	6	8.98	66.8		31.8	140.7
All Other Causes of Death	80	86.06	88.1		69.8	111.8
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

investigated by race, the white population shows a similar mortality pattern to that observed for the total cohort (Table 8). For nonwhites, causes of death (Table 9) for which there were five observed or expected deaths and where there was a statistically significant excess were all malignant neoplasms (PMR=118.6, $p<0.05$), cancer of the stomach (PMR=175.5, $p<0.05$), cancer of the liver (PMR=205.1, $p<0.05$), cancer of the kidney (PMR=254.5, $p<0.05$), cancer of the lymphatic and haematopoietic tissue (PMR=169.2, $p<0.05$), diabetes mellitus (PMR=176.1, $p<0.05$), and nephritis and nephrosis (PMR=192.1, $p<0.05$).

B. Nonreduction Process

A total of 3596 employees worked in a plant that had no reduction process (Table 10). The overall PMR for these employees was 105.2. The only excess within the category of neoplasms was for "all other malignant neoplasms" where the PMR was 145.9 ($p<0.01$). Other causes of death showing a statistically significant excess were benign and unspecified neoplasms with a PMR of 227.3 ($p<0.01$), "all other heart disease" with a PMR of 117.2 ($p<0.01$), and "nephritis and nephrosis" with a PMR of 293.8 ($p<0.01$). Investigation separately for males and females indicated no causes of death other than those identified in excess for the total cohort. When we evaluated mortality patterns separately for race, in addition to the four causes of death in excess for the total group of nonreduction plant workers we found for whites a PMR of 122.8 ($p<0.05$) for cancer of the large intestine and a PMR of 135.4 ($p<0.01$) for chronic endocarditis and other myocardial insufficiency. For nonwhites, we found that

the excess of stomach cancer, liver cancer, lymphatic cancer and nephritis reported in the nonwhite population comprising the total cohort occurred in these nonreduction plants. The PMR for all malignancies for nonwhites in the nonreduction plants was 128.0 ($p<0.01$).

Of the 2777 workers in the 8 plants with a reduction process, 1320 spent the majority of their time in a nonreduction process. For this group of workers the PMR for all malignant neoplasms was 93.6. There were statistically significant excesses of cancer of the lymphatic and haematopoietic tissue (PMR=140.1, $p<0.05$), cerebrovascular disease (PMR=126.9, $p<0.05$), hypertension without heart disease (PMR=230.2, $p<0.05$) and nephritis and nephrosis (PMR=196.8, $p<0.01$). We also note the excess for asthma (PMR=331.0, $p<0.05$) based on only four observed deaths. There were only 56 females in this group of workers so the mortality pattern of the total group is essentially the same as that observed for males. For whites, the excesses were the same as that observed for the total group of 1320 workers. For nonwhites, excesses occurred in hypertension with heart disease (PMR=239.2, $p<0.05$) and "all other causes of death" (PMR=202.9, $p<0.01$).

Table 10
Observed and Expected Deaths and Proportionate Mortality Ratios for Nonreduction Plant Employees

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	3596	3596.00	100.0		---	---
Tuberculosis	3	4.62	65.0		21.2	199.5
All Malignant Neoplasms	906	861.09	105.2		99.5	111.3
Cancer of Buccal Cavity & Pharynx	11	18.19	60.5		33.8	108.3
Cancer of Digestive Organs & Peritoneum	225	213.51	105.4		92.9	119.6
Cancer of Esophagus	11	20.10	54.7	*	30.7	97.7
Cancer of Stomach	36	30.13	119.5		86.4	165.4
Cancer of Large Intestine	103	85.59	120.3		99.5	145.6
Cancer of Rectum	20	16.64	120.2		77.7	186.0
Cancer of Biliary Passages & Liver	17	19.49	87.2		54.3	140.0
Cancer of Pancreas	35	41.81	83.7		60.3	116.3
Cancer of All Other Digestive Organs	3	6.17	48.6		16.1	147.0
Cancer of Respiratory System	316	297.08	106.4		95.8	118.1
Cancer of Larynx	4	9.69	41.3		16.0	106.4
Cancer of Bronchus, Trachea, Lung	310	284.73	108.9		97.9	121.0
Cancer of All Other Respiratory	2	2.65	75.4		18.9	299.8
Cancer of Breast	9	10.45	86.1		45.8	161.8
All Uterine Cancers (Females only)	3	2.45	122.7		40.0	376.1
Cancer of Cervix Uteri (Females only)	0	0.98	---		---	---
Cancer of Other Female Genital Organs	2	3.16	63.3		16.3	246.3
Cancer of Prostate (Males only)	84	96.35	87.2		70.7	107.6
Cancer of Testes and Other Male Genital Organs	1	1.29	77.4		11.0	546.2
Cancer of Kidney	25	18.32	136.5		92.5	201.4
Cancer of Bladder and Other Urinary Organs	28	26.92	104.4		73.6	153.9
Malignant Melanoma of Skin	11	8.95	123.0		68.2	221.5
Cancer of Eye	1	0.44	229.1		34.1	1539.1
Cancer of Central Nervous System	14	15.51	90.3		53.6	152.1
Cancer of Thyroid & Other Endocrine Glands	4	1.89	211.7		81.3	551.4
Cancer of Bone	1	1.36	73.5		10.4	517.5
Cancer of All Lymphatic, Haematopoietic Tissue	72	71.84	100.2		79.7	126.0
Lymphosarcoma & Reticulosarcoma	6	7.54	79.6		35.9	176.7
Hodgkins Disease	2	2.51	79.8		20.0	317.7
Leukemia & Aleukemia	27	30.06	89.8		61.7	130.8
Cancer of All Other Lymphopoietic Tissue	37	31.74	116.6		84.6	160.6
All Other Malignant Neoplasms	99	67.83	145.9	**	120.2	177.2
Benign Neoplasms	19	8.36	227.3	**	146.9	351.8
Diabetes Mellitus	55	54.16	101.6		78.1	132.0
Cerebrovascular Disease	237	245.53	96.5		85.4	109.1
All Heart Disease	1477	1457.21	101.4		97.5	105.4
Rheumatic Heart Disease	8	12.85	62.2		31.4	123.5
Ischemic Heart Disease	1038	1254.88	82.7	**	78.8	86.8
Chronic Endocard. Dis., Other Myocard. Insuff.	95	73.19	129.8	*	106.5	158.2
Hypertension with Heart Disease	28	35.66	78.5		54.4	113.4
All Other Heart Disease	308	262.71	117.2	**	105.3	130.5
Hypertension w/o Heart Disease	11	10.03	109.7		60.8	197.8
Non-malignant Respiratory Disease	258	322.34	80.0	**	71.3	89.9
Influenza & Pneumonia	85	117.33	72.4	**	58.9	89.1
Bronchitis, Emphysema, Asthma	40	49.83	80.3		59.1	109.1
Bronchitis	4	8.85	45.2		17.4	117.2
Emphysema	34	38.27	88.8		63.6	124.1
Asthma	2	3.25	61.5		15.6	242.6
Other Non-malignant Respiratory Disease	133	163.39	81.4	*	69.0	96.0
Ulcer of Stomach & Duodenum	13	10.91	119.1		69.3	204.8
Cirrhosis of Liver	30	47.45	63.2	*	44.5	89.8
Nephritis & Nephrosis	60	20.42	293.8	**	231.0	373.6
All External Causes of Death	140	147.02	95.2		81.7	111.0
Accidents	99	93.90	105.4		87.3	127.4
Motor Vehicle Accidents	43	34.82	123.5		92.6	164.8
All Other Accidents	56	59.93	93.4		72.2	120.9
Suicides	27	36.77	73.4		50.8	106.2
Homicides & Other External Causes	14	16.36	85.6		51.5	142.3
All Other Causes of Death	387	371.99	104.0		94.7	114.3
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 11
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees in Reduction Plants Spending the Majority of Their Time in a Nonreduction Process

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	1320	1320.00	100.0		---	---
Tuberculosis	0	1.63	---		---	---
All Malignant Neoplasms	302	322.52	93.6		85.0	103.2
Cancer of Buccal Cavity & Pharynx	2	6.98	28.7		7.8	104.7
Cancer of Digestive Organs & Peritoneum	78	79.22	98.5		79.4	122.1
Cancer of Esophagus	1	7.56	13.2	*	2.5	69.3
Cancer of Stomach	15	11.09	135.2		81.9	223.4
Cancer of Large Intestine	30	31.64	94.8		66.6	135.0
Cancer of Rectum	6	6.20	96.8		43.6	215.1
Cancer of Biliary Passages & Liver	6	7.20	83.4		37.6	185.0
Cancer of Pancreas	18	15.64	115.1		72.8	182.1
Cancer of All Other Digestive Organs	2	2.28	87.8		22.0	350.4
Cancer of Respiratory System	91	114.28	79.6	*	65.6	96.7
Cancer of Larynx	2	3.73	53.6		13.7	209.3
Cancer of Bronchus, Trachea, Lung	89	109.53	81.3	*	66.7	98.9
Cancer of All Other Respiratory	0	1.02	---		---	---
Cancer of Breast	4	3.10	128.9		50.2	331.4
All Uterine Cancers (Females only)	1	0.71	140.9		20.4	974.6
Cancer of Cervix Uteri (Females only)	1	0.32	314.6		49.7	1991.8
Cancer of Other Female Genital Organs	1	0.90	110.7		15.9	768.0
Cancer of Prostate (Males only)	32	34.15	93.7		66.6	131.8
Cancer of Testes and Other Male Genital Organs	1	0.51	194.7		28.5	1332.3
Cancer of Kidney	11	7.05	156.1		87.0	280.0
Cancer of Bladder and Other Urinary Organs	10	9.61	104.1		56.2	193.0
Malignant Melanoma of Skin	3	3.59	83.5		27.0	257.8
Cancer of Eye	0	0.17	---		---	---
Cancer of Central Nervous System	3	6.21	48.3		16.0	145.6
Cancer of Thyroid & Other Endocrine Glands	0	0.72	---		---	---
Cancer of Bone	2	0.53	375.9	*	103.5	1364.5
Cancer of All Lymphatic, Haematopoietic Tissue	38	27.12	140.1	*	102.5	191.6
Lymphosarcoma & Reticulosarcoma	6	2.91	206.3		94.4	450.9
Hodgkins Disease	3	1.03	291.2		99.0	856.3
Leukemia & Aleukemia	13	11.31	115.0		66.9	197.4
Cancer of All Other Lymphopoietic Tissue	16	11.87	134.8		82.9	219.1
All Other Malignant Neoplasms	25	25.39	98.5		66.8	145.1
Benign Neoplasms	5	3.08	162.2		68.1	386.0
Diabetes Mellitus	15	19.66	76.3		46.2	125.9
Cerebrovascular Disease	108	85.13	126.9	*	105.9	152.0
All Heart Disease	531	530.71	100.1		93.7	106.8
Rheumatic Heart Disease	4	4.81	83.1		31.3	220.7
Ischemic Heart Disease	422	460.01	91.7	*	85.0	99.0
Chronic Endocard. Dis.; Other Myocard. Insuff.	18	25.51	70.6		44.8	111.2
Hypertension with Heart Disease	11	12.55	87.6		48.7	157.6
All Other Heart Disease	76	94.56	80.4	*	64.8	99.7
Hypertension w/o Heart Disease	8	3.48	230.2	*	117.5	450.8
Non-malignant Respiratory Disease	103	115.44	89.2		74.3	107.2
Influenza & Pneumonia	39	40.23	96.9		71.3	131.8
Bronchitis, Emphysema, Asthma	17	18.47	92.1		57.4	147.5
Bronchitis	4	3.23	123.8		46.6	328.9
Emphysema	9	14.23	63.3		33.2	120.4
Asthma	4	1.21	331.0	*	131.4	833.2
Other Non-malignant Respiratory Disease	47	59.55	78.9		59.8	104.2
Ulcer of Stomach & Duodenum	3	3.93	76.3		24.7	235.3
Cirrhosis of Liver	15	19.05	78.7		47.8	129.6
Nephritis & Nephrosis	14	7.11	196.8	**	117.9	328.6
All External Causes of Death	66	61.82	106.8		86.0	132.6
Accidents	44	38.34	114.8		86.8	151.8
Motor Vehicle Accidents	19	15.37	123.7		80.5	190.0
All Other Accidents	25	23.28	107.4		73.1	157.8
Suicides	21	15.70	133.8		88.1	203.0
Homicides & Other External Causes	1	7.79	12.8	*	2.7	61.7
All Other Causes of Death	150	133.99	111.9		96.2	130.2
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

C. Mortality for the Reduction Process

There were 1866 workers who had some employment in the reduction process. The overall PMR for cancer was 106.6 which was not statistically significant (Table 12). The PMR for lung cancer was 117.8 with a corresponding 95% confidence interval of (103.1, 134.5). Cancer of the kidney was also elevated with a PMR of 200.1 and a corresponding 95% confidence interval of (131.7, 303.8). The only nonmalignant cause of death with a statistically significant excess was cerebral vascular disease with a PMR of 135.3 and a corresponding 95% confidence interval of (116.0, 157.7). The PMR for the category ischemic heart disease was low [PMR=87.2 with corresponding confidence interval of (81.6, 93.2)]. Since only 6 women were employed in the reduction process, the mortality patterns in Table 12 are essentially the same for males. When analysis was done by race, some additional causes were in excess. For whites, in addition to respiratory and kidney cancer, there was an excess in cancer of the lymphatic and haematopoietic tissue (PMR=132.2, $p<0.05$). For nonwhites, the only excess was for diabetes where the PMR was 389.5 ($p<0.01$).

When the 62 causes of death were re-evaluated for men spending the majority of their time in the reduction process, the mortality patterns were similar to those "ever employed in the reduction process" but tended to be slightly increased for many of the malignancies (Table 13). The PMR for the category all malignant neoplasms increased from 106.6 to 109.5 ($p<0.05$). Similarly, the PMRs for cancer of the lung and kidney were

Table 12
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Ever Employed in a Reduction Process

Cause of Death (ICDA 8th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	1858	1858.00	100.0		---	---
Tuberculosis	1	2.46	40.3		6.1	267.2
All Malignant Neoplasms	499	488.17	106.8		88.9	114.9
Cancer of Buccal Cavity & Pharynx	5	10.60	58.8		25.3	121.9
Cancer of Digestive Organs & Peritoneum	106	114.26	91.9		76.4	110.6
Cancer of Esophagus	7	11.66	59.0		26.5	122.4
Cancer of Stomach	13	16.25	80.0		48.6	137.3
Cancer of Large Intestine	38	44.50	87.6		64.3	119.5
Cancer of Rectum	5	8.81	56.8		24.0	134.8
Cancer of Biliary Passages & Liver	9	10.39	86.7		45.2	166.1
Cancer of Pancreas	29	22.86	127.9		89.2	183.4
Cancer of All Other Digestive Organs	3	3.21	93.5		30.2	289.5
Cancer of Respiratory System	197	172.88	114.0		99.9	130.0
Cancer of Larynx	1	5.76	17.4	*	3.1	97.5
Cancer of Bronchus, Trachea, Lung	195	165.57	117.8	*	103.1	134.5
Cancer of All Other Respiratory	1	1.54	64.8		8.3	482.4
Cancer of Breast	0	1.00	---		---	---
All Uterine Cancers (Females only)	0	0.11	---		---	---
Cancer of Cervix Uteri (Females only)	0	0.05	---		---	---
Cancer of Other Female Genital Organs	1	0.16	643.6	*	120.0	3450.7
Cancer of Prostate (Males only)	39	47.68	81.8		60.1	111.3
Cancer of Testes and Other Male Genital Organs	2	0.83	240.0		82.7	818.1
Cancer of Kidney	21	10.50	200.1	**	131.7	302.8
Cancer of Bladder and Other Urinary Organs	14	13.26	105.6		82.7	177.9
Malignant Melanoma of Skin	7	5.58	125.2		66.9	261.7
Cancer of Eye	0	0.24	---		---	---
Cancer of Central Nervous System	6	9.56	83.7		42.0	186.7
Cancer of Thyroid & Other Endocrine Glands	0	1.04	---		---	---
Cancer of Bone	2	0.78	256.7		67.5	976.1
Cancer of All Lymphatic, Haematopoietic Tissue	50	39.07	128.0		97.4	166.2
Lymphosarcoma & Reticulosarcoma	5	4.22	118.6		48.4	294.0
Hodgkins Disease	3	1.59	188.8		62.2	574.3
Leukemia & Aleukemia	20	16.05	124.6		80.6	192.6
Cancer of All Other Lymphopoietic Tissue	22	17.21	127.8		84.4	193.6
All Other Malignant Neoplasms	47	37.12	126.6		85.6	187.9
Benign Neoplasms	5	4.33	115.5		48.1	276.9
Diabetes Mellitus	28	27.65	101.3		70.1	146.3
Cerebrovascular Disease	151	111.84	135.3	**	115.0	157.7
All Heart Disease	710	742.22	95.7		80.4	101.2
Rheumatic Heart Disease	3	6.62	45.3		15.1	138.2
Ischemic Heart Disease	561	643.10	87.2	**	81.8	93.2
Chronic Endocard. Dis.; Other Myocard. Insuff.	25	33.78	74.1		50.3	109.0
Hypertension with Heart Disease	17	18.13	93.8		58.5	150.4
All Other Heart Disease	104	133.88	77.7	**	64.8	93.4
Hypertension w/o Heart Disease	6	4.78	126.1		56.6	279.8
Non-malignant Respiratory Disease	126	156.86	80.3	**	68.0	94.8
Influenza & Pneumonia	42	52.52	80.0		59.5	107.5
Bronchitis, Emphysema, Asthma	22	25.71	85.6		56.5	129.5
Bronchitis	3	4.39	68.4		22.2	210.2
Emphysema	16	19.66	80.8		48.5	131.0
Asthma	3	1.72	174.7		57.2	539.7
Other Non-malignant Respiratory Disease	62	82.30	75.3	*	59.1	96.0
Ulcer of Stomach & Duodenum	7	5.42	129.2		61.8	270.1
Cirrhosis of Liver	15	31.06	48.3	**	29.6	78.7
Nephritis & Nephrosis	15	9.66	155.3		94.1	258.1
All External Causes of Death	105	95.28	106.8		80.0	128.8
Accidents	87	89.84	111.8		89.1	140.1
Motor Vehicle Accidents	25	24.64	101.4		69.6	147.8
All Other Accidents	42	35.77	117.4		87.3	157.9
Suicides	30	25.77	116.4		82.1	165.0
Homicides & Other External Causes	8	12.57	63.5		32.8	123.5
All Other Causes of Death	198	188.30	105.3		93.1	121.3
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 13
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Spending a Majority of Time in a Reduction Process

Cause of Death (ICDA 8th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	1449	1449.00	100.0		---	---
Tuberculosis	1	1.83	51.9		7.8	355.1
All Malignant Neoplasms	397	382.63	109.6	*	100.8	118.1
Cancer of Buccal Cavity & Pharynx	5	8.34	60.0		25.3	142.2
Cancer of Digestive Organs & Peritoneum	82	84.60	92.8		76.1	114.2
Cancer of Esophagus	7	9.18	78.5		36.7	159.6
Cancer of Stomach	8	12.89	83.5		32.1	135.8
Cancer of Large Intestine	33	34.85	95.5		68.2	133.8
Cancer of Rectum	4	6.63	55.9		22.3	153.9
Cancer of Biliary Passages & Liver	7	8.08	88.9		41.5	181.8
Cancer of Pancreas	21	17.85	119.8		78.3	182.9
Cancer of All Other Digestive Organs	2	2.49	80.3		20.2	320.0
Cancer of Respiratory System	161	133.59	120.5	*	104.2	138.4
Cancer of Larynx	1	4.45	22.5		3.8	134.2
Cancer of Bronchus, Trachea, Lung	159	127.95	124.3	**	107.3	144.0
Cancer of All Other Respiratory	1	1.20	83.7		11.8	591.9
Cancer of Breast	0	0.73	---		---	---
All Uterine Cancers (Females only)	0	0.08	---		---	---
Cancer of Cervix Uteri (Females only)	0	0.04	---		---	---
Cancer of Other Female Genital Organs	1	0.11	946.9	**	195.9	4587.1
Cancer of Prostate (Males only)	31	37.27	83.2		56.9	117.8
Cancer of Testes and Other Male Genital Organs	1	0.65	153.1		21.8	1089.8
Cancer of Kidney	17	8.11	209.7	**	122.0	332.3
Cancer of Bladder and Other Urinary Organs	10	10.34	96.7		52.2	178.3
Malignant Melanoma of Skin	5	4.31	115.9		48.4	277.7
Cancer of Eye	0	0.18	---		---	---
Cancer of Central Nervous System	7	7.38	95.1		45.5	188.0
Cancer of Thyroid & Other Endocrine Glands	0	0.81	---		---	---
Cancer of Bone	0	0.80	---		---	---
Cancer of All Lymphatic, Haematopoietic Tissue	37	30.21	122.1		86.8	167.8
Lymphosarcoma & Reticulosarcoma	4	3.27	122.2		46.0	324.6
Hodgkins Disease	2	1.23	162.2		41.2	639.1
Leukemia & Aleukemia	15	12.47	120.3		72.7	198.9
Cancer of All Other Lymphopoietic Tissue	16	13.33	120.0		73.7	195.3
All Other Malignant Neoplasms	40	26.72	139.9	*	102.8	189.0
Benign Neoplasms	8	3.36	148.7		82.3	354.6
Diabetes Mellitus	22	21.48	102.4		87.7	155.1
Cerebrovascular Disease	121	87.15	138.8	**	117.0	164.7
All Heart Disease	545	578.37	94.6		86.8	100.9
Rheumatic Heart Disease	2	5.12	39.1		10.3	148.3
Ischemic Heart Disease	428	499.82	85.7	**	78.4	92.4
Chronic Endocard. Dis.; Other Myocard. Insuff.	20	25.28	79.1		48.4	117.2
Hypertension with Heart Disease	13	14.07	92.4		53.8	158.8
All Other Heart Disease	82	103.69	79.0	*	64.2	97.2
Hypertension w/o Heart Disease	4	3.70	108.0		40.8	287.2
Non-Malignant Respiratory Disease	99	122.38	80.9	*	67.1	97.8
Influenza & Pneumonia	28	40.89	68.5	*	47.7	98.3
Bronchitis, Emphysema, Asthma	16	20.08	79.7		49.1	129.5
Bronchitis	2	3.43	58.3		14.9	229.0
Emphysema	11	15.82	70.9		39.5	127.1
Asthma	3	1.33	225.5		76.0	677.7
Other Non-malignant Respiratory Disease	55	64.27	85.8		68.1	110.7
Ulcer of Stomach & Duodenum	8	4.22	142.2		84.2	314.8
Cirrhosis of Liver	11	23.68	46.1	**	28.1	81.3
Nephritis & Nephrosis	11	7.51	146.4		81.5	282.9
All External Causes of Death	82	76.20	107.6		86.7	130.8
Accidents	48	46.72	102.7		76.7	134.1
Motor Vehicle Accidents	18	19.30	93.3		56.9	145.1
All Other Accidents	30	27.78	108.0		73.1	153.3
Suicides	26	20.01	129.9		89.4	188.8
Homicides & Other External Causes	8	9.48	84.5		43.1	165.8
All Other Causes of Death	145	144.85	100.1		85.8	118.6
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

increased slightly (PMR=124.3 and 209.7, respectively). The remainder category "all other malignant neoplasms" is also significant with a PMR of 139.3 ($p<0.05$).

Since the primary departments of interest in the Tripartite Study were the potroom and carbon departments, we investigated mortality patterns separately for these two departments. There were 943 employees with some experience in the potroom department. The PMR for all malignancies was 106.8 with a corresponding 95% confidence interval of (96.1, 118.6) (Table 14). The PMR for cancer of the lung was 111.9 with a corresponding confidence interval of (92.6, 135.2). The only malignancy with five or more observed deaths and a statistically significant elevation was kidney cancer with a PMR of 297.9 and a corresponding 95% confidence interval of (187.1, 474.2). There was also an excess of ulcer of the stomach and duodenum based on six observed deaths and 2.69 expected (PMR=223.0, $p<0.05$). For employees with a majority of time in the potroom the PMR for all malignant neoplasms was 114.8 with a corresponding 95% confidence interval of (100.7, 130.9) (Table 15). Of those causes with more than 5 observed or expected deaths, cancer of the kidney and ulcer of the stomach were elevated (PMR=285.8, $p<0.01$ and PMR=317.2, $p<0.05$, respectively). Ischemic heart disease was significantly low (PMR=80.6, $p<0.01$).

The carbon department had fewer workers than the potroom department. For the 489 employees with some employment in the carbon department, the PMR for all malignancies was 105.8 (Table 16). Both cancer of the kidney (PMR=250.7, $p<0.01$) and

Table 14
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Ever Employed in the Potroom Department

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	943	943.00	100.0		---	---
Tuberculosis	0	1.34	---		---	---
All Malignant Neoplasms	258	238.81	108.0		96.1	118.6
Cancer of Buccal Cavity & Pharynx	5	6.67	88.2		36.9	211.1
Cancer of Digestive Organs & Peritoneum	51	59.48	87.2		66.9	113.7
Cancer of Esophagus	4	6.38	62.9		23.9	165.5
Cancer of Stomach	7	8.41	83.2		39.9	173.8
Cancer of Large Intestine	17	22.42	75.8		47.5	121.1
Cancer of Rectum	3	4.44	67.5		22.0	207.3
Cancer of Biliary Passages & Liver	6	5.35	112.2		50.5	248.0
Cancer of Pancreas	12	11.63	103.2		58.8	181.1
Cancer of All Other Digestive Organs	2	1.61	123.9		31.1	483.6
Cancer of Respiratory System	97	88.62	106.2		88.7	130.8
Cancer of Larynx	1	3.02	33.1		5.2	212.8
Cancer of Bronchus, Trachea, Lung	96	85.80	111.9		92.8	136.2
Cancer of All Other Respiratory	0	0.80	---		---	---
Cancer of Breast	0	0.28	---		---	---
All Uterine Cancers (Females only)	0	0.00	---		---	---
Cancer of Cervix Uteri (Females only)	0	0.00	---		---	---
Cancer of Other Female Genital Organs	0	0.00	---		---	---
Cancer of Prostate (Males only)	24	23.91	100.4		67.7	148.8
Cancer of Testes and Other Male Genital Organs	2	0.45	441.4	*	124.5	1584.5
Cancer of Kidney	15	5.37	297.9	**	167.1	474.2
Cancer of Bladder and Other Urinary Organs	8	6.51	92.2		41.8	204.8
Malignant Melanoma of Skin	3	2.88	104.2		33.7	322.1
Cancer of Eye	0	0.12	---		---	---
Cancer of Central Nervous System	1	4.97	20.1		3.8	118.9
Cancer of Thyroid & Other Endocrine Glands	0	0.64	---		---	---
Cancer of Bone	2	0.41	493.7	*	141.8	1720.8
Cancer of All Lymphatic, Haematopoietic Tissue	27	19.88	135.9		93.7	197.1
Lymphosarcoma & Reticulosarcoma	1	2.15	46.6		6.9	314.7
Hodgkins Disease	3	0.84	355.5	*	123.4	1024.2
Leukemia & Aleukemia	11	8.08	136.1		78.7	244.8
Cancer of All Other Lymphopoietic Tissue	12	8.79	136.5		77.9	238.2
All Other Malignant Neoplasms	22	19.09	115.2		78.2	174.2
Benign Neoplasms	0	2.16	---		---	---
Diabetes Mellitus	12	14.11	85.1		48.8	149.1
Cerebrovascular Disease	55	54.64	124.0		98.8	185.9
All Heart Disease	384	370.47	98.3		90.7	108.4
Rheumatic Heart Disease	2	3.34	60.0		15.3	238.8
Ischemic Heart Disease	278	319.30	87.1	**	78.2	95.7
Chronic Endocard. Dis.; Other Myocard. Insuff.	14	16.49	84.9		50.8	142.8
Hypertension with Heart Disease	10	8.85	104.7		56.8	193.8
All Other Heart Disease	60	68.15	88.0		69.0	112.2
Hypertension w/o Heart Disease	2	2.42	82.7		20.8	329.4
Non-malignant Respiratory Disease	68	76.81	88.5		70.0	111.0
Influenza & Pneumonia	20	25.26	79.1		51.5	121.5
Bronchitis, Emphysema, Asthma	13	12.71	102.2		59.5	175.4
Bronchitis	0	2.14	---		---	---
Emphysema	11	9.79	112.3		62.4	202.0
Asthma	2	0.89	223.7		58.1	861.8
Other Non-malignant Respiratory Disease	35	40.56	86.2		62.4	118.1
Ulcer of Stomach & Duodenum	8	2.89	223.0	*	102.4	485.5
Cirrhosis of Liver	7	16.45	42.6	*	20.8	86.4
Nephritis & Nephrosis	7	4.85	144.2		68.2	300.6
All External Causes of Death	54	54.64	98.8		78.2	124.8
Accidents	34	32.91	103.3		75.4	141.6
Motor Vehicle Accidents	13	13.99	92.9		55.4	158.0
All Other Accidents	21	19.18	109.6		72.2	158.4
Suicides	14	13.99	100.1		60.1	166.6
Homicides & Other External Causes	6	7.74	77.5		38.2	169.0
All Other Causes of Death	98	92.78	105.6		87.8	127.2
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

Table 15
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Spending a Majority of Time in the Potroom Department

Cause of Death (ICDA 8th Revision Codes)	OBS	EXP	SPMR		95% Limits LOWER	UPPER
All Causes of Death	556	556.00	100.0		---	---
Tuberculosis	0	0.82	---		---	---
All Malignant Neoplasms	183	141.98	114.8	*	100.7	130.9
Cancer of Buccal Cavity & Pharynx	4	3.35	119.5		45.1	318.6
Cancer of Digestive Organs & Peritoneum	33	34.63	95.3		68.5	132.5
Cancer of Esophagus	3	3.82	78.6		25.6	241.8
Cancer of Stomach	5	5.03	99.4		41.5	237.7
Cancer of Large Intestine	13	13.21	98.4		57.5	168.4
Cancer of Rectum	1	2.80	38.4		5.8	252.2
Cancer of Biliary Passages & Liver	4	3.18	125.7		47.4	333.2
Cancer of Pancreas	8	8.68	97.2		39.4	192.9
Cancer of All Other Digestive Organs	1	0.95	105.7		14.9	748.9
Cancer of Respiratory System	82	53.04	118.8		92.4	147.8
Cancer of Larynx	0	1.79	---		---	---
Cancer of Bronchus, Trachea, Lung	62	50.77	122.1		96.5	154.5
Cancer of All Other Respiratory	0	0.47	---		---	---
Cancer of Breast	0	0.18	---		---	---
All Uterine Cancers (Females only)	0	0.00	---		---	---
Cancer of Cervix Uteri (Females only)	0	0.00	---		---	---
Cancer of Other Female Genital Organs	0	0.00	---		---	---
Cancer of Prostate (Males only)	17	14.32	118.7		74.4	189.3
Cancer of Testes and Other Male Genital Organs	1	0.28	358.2		57.6	2241.7
Cancer of Kidney	9	3.15	285.5	**	153.4	532.5
Cancer of Bladder and Other Urinary Organs	2	3.80	52.6		13.5	204.5
Malignant Melanoma of Skin	2	1.88	110.2		30.0	474.3
Cancer of Eye	0	0.07	---		---	---
Cancer of Central Nervous System	2	2.91	68.7		17.4	271.1
Cancer of Thyroid & Other Endocrine Glands	0	0.32	---		---	---
Cancer of Bone	0	0.24	---		---	---
Cancer of All Lymphatic, Haematopoietic Tissue	17	11.79	144.9		90.8	231.3
Lymphosarcoma & Reticulosarcoma	1	1.28	78.5		11.3	560.8
Hodgkins Disease	2	0.50	398.9	*	110.3	1428.6
Leukemia & Aleukemia	8	4.75	168.3		85.1	333.0
Cancer of All Other Lymphopoietic Tissue	6	5.22	115.0		51.9	254.9
All Other Malignant Neoplasms	14	11.31	123.8		73.8	207.7
Benign Neoplasms	0	1.29	---		---	---
Diabetes Mellitus	5	5.39	98.3		47.9	189.8
Cerebrovascular Disease	41	32.28	127.1		94.8	170.7
All Heart Disease	202	216.40	93.2		83.7	103.7
Rheumatic Heart Disease	2	1.94	103.0		25.8	410.6
Ischemic Heart Disease	150	188.07	80.0	**	70.9	91.7
Chronic Endocard. Dis.; Other Myocard. Insuff.	7	9.63	72.7		35.0	150.9
Hypertension with Heart Disease	7	5.78	121.1		58.1	252.5
All Other Heart Disease	38	40.39	89.1		65.1	122.0
Hypertension w/o Heart Disease	1	1.44	69.3		9.9	485.1
Non-Malignant Respiratory Disease	41	44.95	91.2		68.1	122.1
Influenza & Pneumonia	10	14.68	68.2		37.2	124.8
Bronchitis, Emphysema, Asthma	8	7.47	107.2		53.8	213.1
Bronchitis	0	1.24	---		---	---
Emphysema	6	5.75	104.4		47.1	231.2
Asthma	2	0.53	374.4	*	103.1	1359.3
Other Non-Malignant Respiratory Disease	23	23.85	96.5		64.7	142.7
Ulcer of Stomach & Duodenum	5	1.58	317.2	**	138.5	728.4
Cirrhosis of Liver	5	9.62	52.0		22.2	121.5
Nephritis & Nephrosis	5	2.88	173.4		73.2	410.8
All External Causes of Death	34	33.36	101.9		76.2	136.3
Accidents	17	20.30	83.7		54.0	128.9
Motor Vehicle Accidents	7	8.88	78.8		38.3	158.1
All Other Accidents	10	11.56	86.5		47.9	158.2
Suicides	11	8.51	129.3		73.0	229.0
Homicides & Other External Causes	6	4.55	132.0		61.0	285.6
All Other Causes of Death	51	55.59	91.8		70.8	119.0
Unknown Causes (In All Causes Category Only)	0					

* Significant at 5% Level; ** Significant at 1% Level

cerebrovascular disease (PMR=136.2, $p<0.05$) were significantly elevated. There were only 140 men spending the majority of their time in the carbon department (Table 17). Thus the statistical power to a true excess is limited. The only cause of death with a statistically significant excess is cerebrovascular disease with a PMR of 195.3 and corresponding 95% confidence interval of (124.6, 306.3).

The PMRs were also computed for the employees spending the majority of their time in mechanical maintenance, electrical maintenance, ingot and power. For most of these departments the number of employees was not sufficient to evaluate many of the specific cancer sites. Table 18 summarizes the observed and expected deaths and PMRs for all malignant neoplasms for employees with the majority of their time in each of the departments in the reduction plant. Those workers with the majority of time in the potrooms show an elevated PMR of 114.8 ($p<0.05$). The site-specific PMRs for cancer have already been discussed for the potroom and carbon departments. For the other four departments the only significant excess was for lung cancer in mechanical maintenance. The PMR was 138.3 with a corresponding 95% confidence interval of (107.2, 176.4).

Table 16
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Ever Employed in the Carbon Department

Cause of Death (ICDA 8th Revision Codes)	OBS	EXP	SPMR	95% Limits LOWER	UPPER
All Causes of Death	489	489.00	100.0	---	---
Tuberculosis	0	0.78	---	---	---
All Malignant Neoplasms	133	128.72	106.8	91.5	122.3
Cancer of Buccal Cavity & Pharynx	2	3.06	65.4	18.6	257.2
Cancer of Digestive Organs & Peritoneum	27	30.64	88.1	61.2	128.9
Cancer of Esophagus	1	3.59	27.8	4.6	172.7
Cancer of Stomach	5	4.62	110.7	46.3	264.8
Cancer of Large Intestine	10	11.44	87.4	47.4	161.1
Cancer of Rectum	1	2.28	44.3	6.9	296.8
Cancer of Biliary Passages & Liver	3	2.84	105.7	34.2	326.4
Cancer of Pancreas	6	8.09	95.5	44.5	216.1
Cancer of All Other Digestive Organs	1	0.82	121.4	17.2	857.5
Cancer of Respiratory System	51	47.16	108.1	83.5	140.1
Cancer of Larynx	0	1.62	---	---	---
Cancer of Bronchus, Trachea, Lung	51	45.12	113.0	87.2	148.5
Cancer of All Other Respiratory	0	0.42	---	---	---
Cancer of Breast	0	0.14	---	---	---
All Uterine Cancers (Females only)	0	0.00	---	---	---
Cancer of Cervix Uteri (Females only)	0	0.00	---	---	---
Cancer of Other Female Genital Organs	0	0.00	---	---	---
Cancer of Prostate (Males only)	12	12.34	97.2	55.8	189.5
Cancer of Testes and Other Male Genital Organs	1	0.26	389.4	63.4	2382.3
Cancer of Kidney	7	2.79	250.7 *	122.9	511.8
Cancer of Bladder and Other Urinary Organs	3	3.19	94.1	30.5	290.6
Malignant Melanoma of Skin	2	1.55	128.9	32.8	511.8
Cancer of Eye	0	0.08	---	---	---
Cancer of Central Nervous System	0	2.85	---	---	---
Cancer of Thyroid & Other Endocrine Glands	0	0.25	---	---	---
Cancer of Bone	1	0.22	456.9	78.8	2717.1
Cancer of All Lymphatic, Haematopoietic Tissue	12	10.37	115.7	68.2	202.4
Lymphosarcoma & Reticulosarcoma	1	1.10	91.2	12.9	648.4
Hodgkins Disease	1	0.47	213.5	31.8	1444.0
Leukemia & Aleukemia	3	4.15	72.2	23.5	221.8
Cancer of All Other Lymphopoietic Tissue	7	4.65	150.5	72.4	313.0
All Other Malignant Neoplasms	15	10.12	148.2	90.1	243.7
Benign Neoplasms	1	1.14	87.9	12.4	621.8
Diabetes Mellitus	11	7.62	144.2	81.5	261.9
Cerebrovascular Disease	38	27.80	136.2 *	100.2	184.9
All Heart Disease	190	187.93	101.1	90.8	112.9
Rheumatic Heart Disease	1	1.70	58.9	8.5	407.8
Ischemic Heart Disease	149	159.73	93.3	81.9	106.3
Chronic Endocard. Dis.; Other Myocard. Insuff.	10	8.25	121.2	65.7	223.7
Hypertension with Heart Disease	3	5.37	55.9	18.8	168.1
All Other Heart Disease	27	36.11	74.8	52.1	107.3
Hypertension w/o Heart Disease	1	1.29	77.2	11.0	543.8
Non-malignant Respiratory Disease	25	38.08	65.6 *	45.9	95.2
Influenza & Pneumonia	9	12.81	71.4	37.7	135.2
Bronchitis, Emphysema, Asthma	3	6.28	47.8	16.0	143.8
Bronchitis	0	1.03	---	---	---
Emphysema	1	4.77	20.9	3.8	122.2
Asthma	2	0.49	407.2 *	113.5	1481.2
Other Non-malignant Respiratory Disease	13	20.10	64.7	38.2	109.5
Ulcer of Stomach & Duodenum	1	1.36	73.3	10.4	515.1
Cirrhosis of Liver	7	9.17	76.4	36.9	158.1
Nephritis & Nephrosis	4	2.55	157.1	59.6	413.6
All External Causes of Death	31	31.90	97.2	71.8	131.9
Accidents	17	19.10	89.0	57.2	138.5
Motor Vehicle Accidents	6	8.35	71.9	33.7	153.1
All Other Accidents	11	10.89	101.1	56.8	179.8
Suicides	12	8.03	149.5	86.7	257.8
Homicides & Other External Causes	2	4.77	41.9	11.5	152.3
All Other Causes of Death	47	49.22	95.5	72.9	125.1
Unknown Causes (In All Causes Category Only)	0				

* Significant at 5% Level; ** Significant at 1% Level

Table 17
Observed and Expected Deaths and Proportionate Mortality Ratios for Employees Spending a Majority of Time in the Carbon Department

Cause of Death (ICDA 9th Revision Codes)	OBS	EXP	SPMR	95% Limits LOWER	UPPER
All Causes of Death	140	140.00	100.0	---	---
Tuberculosis	0	0.25	---	---	---
All Malignant Neoplasms	38	35.48	107.1	81.5	140.7
Cancer of Buccal Cavity & Pharynx	0	0.68	---	---	---
Cancer of Digestive Organs & Peritoneum	6	6.78	81.2	46.7	178.1
Cancer of Esophagus	1	1.04	96.0	13.7	674.5
Cancer of Stomach	0	1.21	---	---	---
Cancer of Large Intestine	3	3.28	91.6	28.8	279.9
Cancer of Rectum	1	0.84	156.0	22.4	1084.9
Cancer of Biliary Passages & Liver	0	0.62	---	---	---
Cancer of Pancreas	3	1.71	175.0	57.7	530.9
Cancer of All Other Digestive Organs	0	0.23	---	---	---
Cancer of Respiratory System	18	13.01	123.0	77.4	185.4
Cancer of Larynx	0	0.45	---	---	---
Cancer of Bronchus, Trachea, Lung	18	12.44	126.6	80.9	204.5
Cancer of All Other Respiratory	0	0.11	---	---	---
Cancer of Breast	0	0.04	---	---	---
All Uterine Cancers (Females only)	0	0.00	---	---	---
Cancer of Cervix Uteri (Females only)	0	0.00	---	---	---
Cancer of Other Female Genital Organs	0	0.00	---	---	---
Cancer of Prostate (Males only)	3	3.90	76.9	25.4	233.0
Cancer of Testes and Other Male Genital Organs	0	0.06	---	---	---
Cancer of Kidney	2	0.76	265.2	70.3	1001.2
Cancer of Bladder and Other Urinary Organs	1	0.85	106.5	15.0	749.4
Malignant Melanoma of Skin	0	0.37	---	---	---
Cancer of Eye	0	0.02	---	---	---
Cancer of Central Nervous System	0	0.68	---	---	---
Cancer of Thyroid & Other Endocrine Glands	0	0.08	---	---	---
Cancer of Bone	0	0.09	---	---	---
Cancer of All Lymphatic, Haematopoietic Tissue	3	2.88	105.0	34.3	321.5
Lymphosarcoma & Reticulosarcoma	0	0.29	---	---	---
Hodgkins Disease	0	0.11	---	---	---
Leukemia & Aleukemia	1	1.15	86.7	12.3	609.6
Cancer of All Other Lymphopoietic Tissue	2	1.30	153.7	39.1	604.1
All Other Malignant Neoplasms	5	2.84	176.2	74.7	412.7
Benign Neoplasms	1	0.32	309.5	48.3	1982.7
Diabetes Mellitus	3	2.19	136.9	44.8	416.8
Cerebrovascular Disease	17	8.70	195.3 **	124.8	306.3
All Heart Disease	50	54.44	91.8	74.1	113.9
Rheumatic Heart Disease	0	0.48	---	---	---
Ischemic Heart Disease	40	45.88	87.2	67.8	112.1
Chronic Endocard. Dis.; Other Myocard. Insuff.	2	2.52	79.4	20.2	212.2
Hypertension with Heart Disease	0	1.65	---	---	---
All Other Heart Disease	8	10.89	75.5	38.9	148.5
Hypertension W/O Heart Disease	0	0.40	---	---	---
Non-malignant Respiratory Disease	5	11.52	43.4 *	18.3	97.5
Influenza & Pneumonia	0	3.91	---	---	---
Bronchitis, Emphysema, Asthma	0	1.85	---	---	---
Bronchitis	0	0.31	---	---	---
Emphysema	0	1.41	---	---	---
Asthma	0	0.14	---	---	---
Other Non-malignant Respiratory Disease	5	6.03	82.9	35.3	194.7
Ulcer of Stomach & Duodenum	0	0.40	---	---	---
Cirrhosis of Liver	2	2.34	85.8	21.9	334.9
Nephritis & Nephrosis	1	0.79	126.5	18.0	887.9
All External Causes of Death	9	7.43	121.1	67.0	218.8
Accidents	6	4.54	132.2	61.9	282.3
Motor Vehicle Accidents	4	1.81	221.4	67.9	567.5
All Other Accidents	2	2.77	72.2	18.7	279.2
Suicides	3	1.79	167.8	56.3	500.1
Homicides & Other External Causes	0	1.11	---	---	---
All Other Causes of Death	14	14.41	97.2	59.2	159.8
Unknown Causes (In All Causes Category Only)	0				

* Significant at 5% Level; ** Significant at 1% Level

Table 18
Observed and Expected Deaths and Proportionate Mortality Ratios
by Department for All Malignant Neoplasms

	OBS	EXP	PMR	95% LOWER	UPPER
POTROOM	163	141.98	114.8*	100.7	130.9
CARBON	38	35.48	107.1	81.5	140.7
INGOT	44	44.33	99.3	76.9	128.1
MECH. MAINT.	117	108.00	108.3	92.7	126.6
ELECT. MAINT.	30	27.60	108.7	79.8	148.0
POWER	5	5.05	99.0	46.2	212.3

D. Selected Causes of Death

For those causes of death that were in excess or for which we have particular interest because of the Tripartite Study, we now present more detailed analysis.

(1) Kidney cancer - The PMR for kidney cancer for the total cohort is 158.1 based on 53 observed deaths and 33.52 expected. All cases of kidney cancer were in males and both white males and nonwhite males had an excess (PMR=157.5 and 257.8, respectively. Of the 53 employees with kidney cancer as a cause of death, 49 had more than 20 years employment. For those employees ever employed in the reduction process, the PMR is 200.1 based on 21 observed deaths and 10.5 expected and a corresponding 95% confidence interval of (131.7, 303.8). This compares to a PMR of 136.5 with a corresponding 95% confidence interval of (92.5, 201.4) for workers in nonreduction plants.

Further investigation within the reduction process indicates

that there is no particular area that appears to have a concentration of excess deaths (Table 19). The excess is not much affected when a PCMR is used instead of a PMR (Table 20). The investigation of kidney cancer by individual plant indicated no pattern for the excess although the distribution of only 53 observed deaths among 37 plants results in numbers too small to conclude that no clustering exists.

Table 19
Observed and Expected Deaths and Proportionate Mortality Ratios by Job Location for Kidney Cancer

	OBS	EXP	PMR	95% LOWER	UPPER
NONREDUCTION PLANT	25	18.32	136.5	92.5	201.4
REDUCTION PLANT	28	15.20	184.2**	128.1	265.0
NONREDUCTION PROCESS	11	7.05	156.1	87.0	280.0
REDUCTION PROCESS	17	8.11	209.7**	132.0	333.3
POTROOM	9	3.15	285.8**	153.4	532.5
CARBON	2	.75	265.2	70.3	1001.3
INGOT	2	.99	201.8	52.1	781.4
MECH. MAINTAIN.	4	2.48	161.1	61.2	423.7
ELECT. MAINTAIN.	0	.61	--	--	--
POWER	0	.11	--	--	--

Table 20
Observed and Expected Deaths and Proportionate Cancer Ratios by Job Location for Kidney Cancer

	OBS	EXP	PMR	95% LOWER	UPPER
NONREDUCTION PLANT	25	19.25	129.9	88.2	191.1
REDUCTION PLANT	28	15.62	179.3**	125.0	257.2
NONREDUCTION PROCESS	11	6.60	166.6	93.5	296.9
REDUCTION PROCESS	17	9.01	188.6**	118.8	299.4
POTROOM	9	3.64	247.1**	132.4	461.2
CARBON	2	.84	237.9	63.1	897.5
INGOT	2	1.02	195.8	51.1	750.7
MECH. MAINTAIN.	4	2.74	146.2	55.8	382.7
ELECT. MAINTAIN.	0	.67	--	--	--
POWER	0	.10	--	--	--

(2) All other cancers - The PMR for the category "all other cancers" was 134.3 ($p<0.01$) with 164 observed deaths and 122.1 expected. The excess did not appear to be restricted to any particular race or sex. Of these, 138 were cancer of an unspecified site, 14 were cancer of multiple sites, and 12 were cancer of soft or connective tissue.

(3) Benign and unspecified neoplasms - The PMR for benign and unspecified neoplasms was 195.6 with a corresponding 95% confidence interval of (136.9, 279.5). The PMR was higher in the nonreduction plants than in the reduction plants (PMR=227.3, $p<0.01$) and PMR=154.7, respectively. The cases did not appear confined to any specific race or sex. The median age at death

for the 29 workers with this cause of death was 70.9. Of the 29 observed deaths, 2 were benign brain tumors and 10 were brain tumors of unspecified nature.

(4) Nephritis and nephrosis - The PMR for nephritis and nephrosis was 242.2 based on 85 observed deaths and 35.09 expected. The excess appeared in reduction as well as nonreduction processes and was not restricted to a specific sex or race group. This ICD classification is often a result of insufficient coding of the death certificate and a review of individual death certificates indicated "renal failure" as a frequent cause of death designated on the death certificates with this cause. Investigation of individual plants indicates that five plants accounted for 52 observed deaths when 13.95 were expected. These plants were both reduction and nonreduction plants.

(5) Cerebral vascular disease - The total cohort had approximately an 11% excess in cerebrovascular disease. This excess appeared restricted to white males where the PMR was 115.2 ($p<0.01$) based on 403 observed deaths and 349.8 expected and was higher in plants with a reduction process where the PMR was 135.3 ($p<0.01$) based on 151 observed deaths compared to a PMR of 98.9 for the remainder of the white male population. For reduction plant workers this represents 30 observed deaths in excess which is approximately the same as the deficit observed for the category "all heart disease". Although the excess occurs in reduction plants it is not confined to the reduction process. The white males who spent the majority of their time in a nonreduction process had a PMR of 132.1 ($p<0.01$) compared to

138.8 ($p<0.01$) for the white males spending the majority of their time in a reduction process.

(6) Respiratory cancer - The primary hypothesis in the Tripartite Study was to determine if there was an excess of lung cancer in the potroom and carbon departments of the reduction process. The overall SMR for lung cancer in that study was 96.4 with a corresponding 95% confidence interval of (83.2, 105.9). The corresponding SMR of the plants in the Tripartite Study which have been included in this study is 91.7 with a corresponding 95% confidence interval of (78.4, 106.5).

For this study the PMR for lung cancer shows a slight excess. The PMR for lung cancer for employees in the reduction process is 124.3 with a corresponding confidence interval of (107.3, 144.0). This compares to a PMR of 108.9 for workers in plants with no reduction process and a PMR of 81.3 ($p<0.05$) for workers in a reduction plant that spent the majority of their time in a nonreduction process. Further investigation was conducted by department within the reduction process (Table 21). Workers spending the majority of their time in the potroom, carbon or ingot department all have excesses of 20%-30% that are not statistically significant. Workers spending the majority of time in mechanical maintenance have a significantly elevated PMR of 136.3 ($p<0.05$).

When the risk is estimated using a proportionate cancer mortality ratio (Table 22), the risk is slightly increased for employees in the nonreduction process of the reduction plant (PCMR=87.9) and decreased for employees in the reduction process

(PCMR=111.9). Neither of these is significantly different from 100. The only significant excess using the PCMR occurs for maintenance workers where the PCMR is 125.7 with a corresponding 95% confidence interval of (101.6, 155.6).

Table 21
Observed and Expected Deaths and Proportionate Mortality Ratios by Job Location for Cancer of Bronchus, Trachea and Lung

	OBS	EXP	PMR	95% LOWER	UPPER
NONREDUCTION PLANT	310	284.73	108.9	97.9	121.0
REDUCTION PLANT	248	238.24	104.1	92.5	117.1
NONREDUCTION PROCESS	89	109.53	81.3*	66.7	98.9
REDUCTION PROCESS	159	127.95	124.3**	107.3	144.0
POTROOM	62	50.77	122.1	96.5	154.5
CARBON	16	12.44	128.6	80.9	204.5
INGOT	19	15.13	125.6	82.0	192.4
MECH. MAINTAIN.	53	38.34	136.3*	107.2	178.3
ELECT. MAINTAIN.	8	9.53	83.9	43.5	162.0
POWER	1	1.69	59.2	9.4	372.4

The observed and expected deaths and PMRs are shown for each plant in Table 23. There was a statistically significant excess at both the Mobile and Vancouver plants (PMR=161.2 and 154.4, respectively). Two other plants with Soderberg processes, had excesses greater than 40% that failed to achieve statistical significance. When we restricted analysis within each plant to employees with reduction experience, the PMR for Vancouver was 162.4 ($p<0.01$), for Point Comfort was 164.6 ($p<0.05$) and for Warrick was 161.8 (not statistically significant).

Table 22
Observed and Expected Deaths and Proportionate Cancer Mortality Ratios by Job Location for Bronchus, Trachea and Lung

	OBS	EXP	PCMR	95% LOWER	95% UPPER
NONREDUCTION PLANT	310	300.93	103.0	94.2	112.7
REDUCTION PLANT	248	243.32	101.9	92.3	112.6
NONREDUCTION PROCESS	89	101.23	87.9	74.4	103.9
REDUCTION PROCESS	159	142.09	111.9	98.6	126.6
POTROOM	62	59.27	104.6	85.9	127.4
CARBON	16	13.09	122.2	82.6	180.8
INGOT	19	15.70	121.0	84.7	172.9
MECH. MAINTAIN.	53	42.15	125.7*	101.6	155.6
ELECT. MAINTAIN.	8	10.39	77.0	44.3	133.8
POWER	1	1.50	66.5	13.6	324.5

The PCMRs for the Point Comfort and Vancouver plants were also significant (151.9, $p<0.01$ and 143.2, $p<0.05$, respectively). The PCMR for Warrick was 112.0.

Table 23
Observed and Expected Deaths and Proportionate Mortality Ratios for Lung Cancer by Plant

Plant	OBS	EXP	PMR	95% LOWER	95% UPPER
ADDY	3	.71	--	--	--
ANDERSON	1	.11	--	--	--
ALCOA	8	7.47	107.2	55.5	206.8
BADIN	12	12.19	98.5	57.5	168.7
BAUXITE	13	12.29	105.8	63.1	177.3
BRIDGEPORT	4	1.94	--	--	--
BUFFALO	0	.16	--	--	--
CHICAGO	3	2.45	--	--	--
CHILLICOTHE	6	4.87	123.2	57.8	262.6
CLEVELAND	42	36.63	114.7	86.0	152.8
CORONA	0	1.08	--	--	--
CRESSONA	23	23.53	97.8	66.5	143.8
DAVENPORT	29	23.39	124.0	88.0	174.8
DETROIT	2	4.39	--	--	--
EAST ST. LOUIS	5	7.99	62.6	27.1	144.5
EDGEWATER	17	18.26	93.1	59.0	146.8
EDISON	11	8.17	134.6	76.9	235.7
FORT MEADE	0	.31	--	--	--
FRANKLIN	2	1.95	--	--	--
LAFAYETTE	21	30.36	69.2	46.2	103.6
LANCASTER	5	2.69	185.5	81.8	420.8
LEBANON	2	.85	--	--	--
LOGANS FERRY	3	1.60	--	--	--
MARSHALL	3	1.09	--	--	--
MASSENA	47	53.08	88.5	67.5	116.1
MOBILE	22	13.65	161.2*	108.8	238.7
NEW KENSINGTON	54	52.96	102.0	79.0	131.5
POINT COMFORT	25	17.42	143.5	99.4	207.3
RICHMOND	4	5.94	67.3	26.7	170.0
ROCKDALE	5	9.58	52.2	23.1	117.7
ROSICLARE	5	2.45	204.4	89.9	464.8
TENNESSEE	107	109.3	97.9	81.7	117.2
TIFFON	1	.72	--	--	--
VANCOUVER	27	17.49	154.4*	108.3	220.1
VERNON	21	16.75	125.4	83.6	188.1
WARRICK	16	11.10	144.2	91.0	228.4
WENTACHEE	9	8.07	111.5	60.1	207.0

(7) Cancer of the Lymphatic and Haematopoietic Cancer - The PMR for the total cohort for lymphatic and haematopoietic cancer was 113.6 with a 95% confidence interval of (96.8, 133.2). The PMR for workers in nonreduction plants was 100.2 compared to a PMR of 130.2 ($p<0.05$) for workers in reduction plants. Within the reduction plants, those workers spending the majority of their time in a nonreduction process had a higher PMR than those in a reduction process [PMR=140.1, $p<0.05$ and PMR=122.1 (not significant), respectively]. The PCMR was 146.7 ($p<0.05$) for workers in the nonreduction process and 111.3 for workers in the reduction process. Analysis based on majority of time in individual departments yielded no statistically significant results. Potroom workers had a PMR of 144.9 with a 95% confidence interval of (90.8, 231.3) and electrical maintenance workers had a PMR of 217.3 with a corresponding 95% confidence interval of (93.3, 506.3). The only individual plant with a significant excess was Tennessee which had a PMR of 172.1 ($p<0.01$. The PMR for leukemia in the total cohort was 102.0. The PMR for those in reduction plants was 117.4 compared to 89.8 for those in nonreduction plants. The number of deaths was small on which to do an analysis by department. However, 8 of the 15 deaths occurred in the potroom with a subsequent PMR of 168.3 based on 8 observed deaths and 4.75 expected with a corresponding 95% confidence interval of (85.1, 333.0). The only individual plant with a significant excess was Edgewater with a PMR of 260.7 ($p<0.05$).

(8) Pancreatic cancer - In this study, the PMRs for

pancreatic cancer did not show a significant excess for either reduction plant workers or workers spending the majority of their time in the potrooms (PMR=103.2 and 87.2). This compares to an SMR of 134.8 for workers in the potrooms of the Tripartite Study. The significant finding of the Tripartite Study was for potroom workers with more than 15 years employment, where the excess was more than twofold. With the data available in the present study a risk for longterm employees could not be obtained.

E. Analysis by Plant

Mortality for each of the 62 selected causes of death was done for each of the 37 study plants. Such analysis must be interpreted with caution since by random chance alone some plants would be expected to deviate from the average value. In addition, many of the plants did not have sufficient numbers for an individual analysis. Because of these limitations, we view the results as preliminary and any plants that are identified should be given consideration for a more detailed study (if feasible) in a second phase.

Table 24 summarizes the observed, expected deaths and Proportionate Mortality Ratios by plant. Of the 29 plants with sufficient sample size to compute a PMR, 14 had a PMR less than 100 and 15 had a PMR greater than 100. Four plants had a statistically significant excess, but one was based on only 5 observed deaths. One plant had a borderline excess of PMR=130.5 with a corresponding 95% confidence interval of (99.9, 170.4).

Numbers were often too small to do an analysis of individual plants for many of the specific cancers. Nevertheless, in reviewing the results from those plants we note the following

Table 24
Observed and Expected Deaths and Proportionate Mortality Ratios for All Malignant Neoplasms by Plant

Plant	OBS	EXP	PMR	95% LOWER	95% UPPER
ADDY	5	2.00	250.6*	123.2	509.9
ANDERSON	1	.37	--	--	--
ALCOA	21	22.02	95.3	66.1	137.6
BADIN	40	37.11	107.8	82.5	140.7
BAUXITE	34	36.16	94.0	70.4	125.5
BRIDGEPORT	12	7.04	170.5*	103.7	280.3
BUFFALO	0	.91	--	--	--
CHICAGO	5	7.06	70.8	33.5	149.4
CHILLICOTHE	16	14.98	106.8	70.8	161.0
CLEVELAND	138	110.16	125.3**	108.6	144.6
CORONA	1	2.85	--	--	--
CRESSONA	64	62.75	102.0	82.8	125.6
DAVENPORT	85	64.20	132.4**	110.5	158.6
DETROIT	14	16.17	86.6	54.6	137.3
EAST ST. LOUIS	28	29.04	96.4	69.5	133.9
EDGEWATER	60	61.07	98.2	78.7	122.6
EDISON	30	24.75	121.2	89.1	165.0
FORT MEADE	1	.88	--	--	--
FRANKLIN	5	5.85	85.4	40.4	180.5
LAFAYETTE	78	87.57	89.1	73.6	107.8
LANCASTER	7	7.83	89.4	47.4	168.3
LEBANON	3	2.16	--	--	--
LOGANS FERRY	5	4.36	104.7	54.5	24.7
MARSHALL	3	2.78	--	--	--
MASSENA	148	152.68	96.4	84.4	111.4
MOBILE	45	38.58	116.6	90.8	149.8
NEW KENSINGTON	160	168.55	94.9	83.0	108.6
POINT COMFORT	45	45.95	97.9	76.5	125.4
RICHMOND	19	19.81	95.9	65.6	140.1
ROCKDALE	23	26.44	87.0	61.4	123.2
ROSICLARE	10	7.78	128.5	74.7	220.9
TENNESSEE	330	323.35	102.1	93.0	112.0
TIFFON	4	2.33	--	--	--
VANCOUVER	52	49.27	105.8	83.6	133.2
VERNON	52	51.06	101.8	80.6	128.7
WARRICK	39	29.89	130.5	99.9	170.4
WENTACHEE	22	22.55	97.6	68.3	139.5

neoplasms which were in excess at particular plants:

(1) The Cleveland plant had PMRs of 280.5 for stomach cancer (based on 12 observed deaths, $p<0.01$), 298.8 for cancer of

the rectum (based on six observed deaths, $p<0.05$) and 464.7 for cancer of the breast (based on 4 observed deaths, $p<0.01$).

(2) The Cressona plant had a PMR of 247.4 for stomach cancer (based on five deaths, $p<0.05$), 261.9 for kidney cancer (based on four deaths, $p<0.05$), and 530.4 for melanoma (based on four deaths, $p<0.01$).

(3) The Davenport plant had a PMR of 177.0 for all digestive cancers (based on 27 observed deaths, $p<0.01$). The PCMR was not significantly elevated for this cause.

(4) The Edgewater plant had a PMR of 260.7 for leukemia (based on six observed deaths, $p<0.05$).

(5) The Massena plant had a PMR of 283.2 for lymphosarcoma (based on 4 observed deaths, $p<0.05$).

(6) The Mobile plant had a PMR of 161.2 ($p<0.05$) for lung cancer. The PCMR was 135.3.

(7) The Tennessee (Alc) plant had a PMR of 172.1 (based on 46 observed deaths, $p<0.01$) for cancer of the lymphatic and haematopoietic tissue.

(8) The Vancouver plant had a PMR of 154.4 for lung cancer (based on 27 observed deaths, $p<0.05$) and a PMR of 356.1 (based on 4 observed deaths, $p<0.05$) for kidney cancer.

Summary

Conclusions from this study must be drawn more cautiously than was necessary for the Tripartite Study because of the inherent limitations of the PMR study design as well as the less specific job classification used in the present study. Furthermore, the large number of estimates of risk that were computed will result in a larger number of false positive findings than can be inferred from the p-values. Conversely, the small number of workers available for many of the estimates of risk precludes any strong statements in regard to those findings that were negative. With these limitations stated, we now summarize the findings we feel are most important. Consistent with the study objectives, we have given most attention in our summary to malignant neoplasms.

The PMR for malignant neoplasms for the total study population was 103.7 and was not significantly different from the total U.S. population. The only specific cancer site which was significantly elevated was kidney cancer with a PMR of 158.1 and a corresponding 95% confidence interval of (121.2, 206.3). The nonspecific disease categories of benign and unspecified neoplasms, nephritis and nephrosis and "all other malignant neoplasms" were elevated and appeared to result from lack of complete specification of cause of death on the certificate. The only other disease category that was elevated for the total cohort was cerebral vascular disease with a PMR of 111.4 ($p<0.05$) and this was accompanied by a deficit in ischemic heart disease (PMR=85.2, $p<0.01$).

The analysis by work area yielded the following:

(1) For the combined group of workers in nonreduction plants the PMR for all malignant neoplasms was 105.2. The only statistically significant excesses occurred for nonspecific disease categories (i.e., nephritis, benign and unspecified neoplasms, all other cancers). Analysis by race indicated that whites had an excess of colon cancer and nonwhites had an excess of stomach, liver and lymphatic cancer.

(2) For the 1320 workers in a reduction plant who spent the majority of their time in a nonreduction process, the PMR for all malignant neoplasms was 93.6. The only specific neoplastic site with a significant elevation was cancer of the lymphatic and haematopoietic tissue (PMR=140, $p<0.05$).

(3) Workers with the majority of their employment in the reduction process had a PMR of 109.5 ($p<0.05$) for all malignant neoplasms. These workers had a PMR of 124.3 for lung cancer ($p<0.01$) and a PMR of 209.2 for kidney cancer ($p<0.01$). When a PCMR was computed, the estimate of risk for lung cancer was a nonsignificant 111.9 but remained significant for kidney cancer (PCMR=188.6, $p<0.01$). The workers spending the majority of their time in the reduction process had a significant excess for two of the study plants. Neither of these plants had an excess in the Tripartite Study. Workers spending the majority of their time in mechanical maintenance also had an excess of lung cancer.

(4) Although workers in reduction plants had a significantly elevated PMR of 130.2 ($p<0.05$), for cancer of the lymphatic and haematopoietic tissue it was greater in workers in the reduction plant spending the majority of their time in a

nonreduction process (PMR=140.1, p<0.05). No individual department had a statistically significant excess, although the small number of observed deaths when analyzed by department makes the results inconclusive.

(5) Analysis by plant is limited by small numbers and a further increase in the expected false positives due to the larger number of estimates of risk. Overall, 14 plants had a PMR for "all malignant neoplasms" below 100, 15 plants were above, and 8 had less than 5 observed deaths from neoplasms. Of plants with greater than 5 observed deaths for "all malignant neoplasms", three had a statistically significant excess and one had borderline significance. Eight of the plants had at least one specific site that showed a statistically significant excess. We could identify no consistent pattern in site-specific cancers among plants with similar processes, although such inferences are clearly limited by small numbers and lack of more detailed job classifications in plants with multiple processes.

References

1. Rockette HE, Arena VC: Mortality studies of aluminum workers: potroom and carbon department. Journal of Occupational Medicine 25(7), 1983.

2. Marsh GM, Preininger M: OCMAP: A user-oriented occupational cohort mortality analysis program. American Statistician 34: 245-246, 1980.

3. Wong O, DeCoufle P: Methodological issues involving the standardized mortality ratio and proportionate mortality ratio in occupational studies. Journal of Occupational Medicine 24:299-304, 1982.

Appendix

Distribution of causes of death using 4 digit ICD codes

ICD	Freq.	ICD	Freq.	ICD	Freq.
88	1	1562	1	2008	4
119	3	1569	1	2019	7
189	1	1570	5	2020	1
310	1	1579	69	2021	1
360	1	1590	3	2024	1
381	3	1599	1	2028	41
384	7	1619	7	2030	25
388	1	1625	1	2040	5
389	54	1629	557	2041	8
419	1	1639	2	2049	2
498	1	1640	1	2050	17
499	1	1701	1	2051	6
539	1	1706	1	2080	9
543	1	1709	1	2081	1
703	2	1712	1	2089	7
1159	2	1713	1	2159	1
1169	1	1716	1	2169	1
1175	1	1719	9	2251	1
1179	2	1722	1	2252	1
1350	1	1725	2	2302	1
1363	2	1727	1	2373	1
1369	1	1729	15	2384	1
1409	1	1734	1	2387	4
1419	2	1749	13	2389	2
1449	1	1790	2	2390	2
1459	2	1809	1	2391	1
1460	2	1820	1	2395	1
1469	1	1830	4	2396	10
1479	3	1850	147	2398	1
1481	1	1869	1	2399	1
1490	5	1874	2	2429	1
1505	2	1889	47	2449	1
1509	17	1890	48	2500	72
1510	3	1891	1	2501	2
1519	56	1892	4	2502	2
1522	2	1899	1	2503	6
1529	1	1909	1	2504	1
1531	1	1910	1	2505	1
1532	2	1913	2	2506	6
1533	4	1916	1	2507	1
1534	2	1919	20	2509	1
1536	5	1930	1	2535	1
1539	152	1940	2	2554	1
1540	6	1946	1	2558	1
1541	24	1950	1	2599	1
1550	12	1990	14	2639	3
1551	2	1991	136	2651	1
1552	8	2000	5	2733	1

Table (continued)

Distribution of causes of death using 4 digit ICD codes

ICD	Freq.	ICD	Freq.	ICD	Freq.
1560	4	2001	6	2738	1
1561	2	2002	1	2754	1
2761	1	4049	4	4402	3
2762	2	4100	1017	4409	65
2765	4	4109	16	4410	4
2773	2	4110	11	4411	1
2780	1	4120	9	4412	1
2793	1	4130	1	4413	41
2810	1	4140	617	4414	3
2848	2	4141	1	4415	7
2849	2	4148	14	4416	3
2859	1	4149	203	4429	1
2866	2	4151	36	4439	8
2888	2	4160	3	4440	1
2898	1	4169	5	4449	5
2899	1	4210	3	4472	1
2900	4	4239	1	4479	1
2901	2	4240	5	4512	1
2910	1	4241	23	4519	2
3030	1	4249	6	4539	1
3089	1	4254	67	4549	1
3109	5	4255	2	4560	4
3229	1	4271	1	4578	1
3239	2	4273	3	4589	3
3240	1	4274	4	4590	5
3310	19	4275	164	4599	1
3312	1	4278	1	4660	1
3314	2	4279	19	4787	1
3319	2	4280	80	4809	1
3320	16	4281	2	4810	4
3334	3	4284	4	4820	3
3352	12	4289	14	4823	1
3400	3	4290	2	4824	1
3418	1	4291	1	4828	1
3419	1	4292	150	4829	1
3429	2	4299	4	4830	1
3481	3	4300	6	4850	35
3483	1	4301	5	4860	103
3485	1	4310	46	4870	1
3489	1	4321	6	4878	1
3561	1	4329	5	4900	3
3570	2	4330	1	4912	6
3760	1	4331	4	4919	1
3940	2	4340	49	4920	54
3941	1	4341	2	4939	9
3949	5	4349	27	4940	1
3959	1	4360	275	4960	141

Table (continued)

Distribution of causes of death using 4 digit ICD codes

ICD	Freq.	ICD	Freq.	ICD	Freq.
3980	1	4370	16	5000	18
3989	4	4371	1	5010	1
4019	11	4378	1	5020	1
4029	48	4379	15	5050	1
4039	12	4380	7	5064	1
5070	17	5715	34	8120	9
5109	3	5718	2	8121	1
5118	1	5719	3	8122	3
5119	4	5722	1	8129	16
5120	4	5724	3	8130	4
5130	3	5728	19	8147	6
5140	6	5733	4	8150	2
5150	13	5739	2	8159	2
5163	1	5742	2	8169	2
5168	2	5743	1	8190	7
5183	1	5750	3	8191	2
5184	2	5751	1	8192	3
5185	3	5754	1	8199	16
5188	9	5761	3	8209	1
5199	1	5770	5	8219	1
5301	1	5771	1	8220	1
5304	1	5789	11	8249	1
5309	1	5809	1	8259	1
5314	4	5829	4	8261	1
5315	2	5838	1	8300	1
5319	1	5839	2	8309	1
5324	2	5845	1	8329	1
5325	2	5849	12	8480	1
5326	1	5850	19	8682	1
5329	1	5860	45	8689	3
5334	6	5900	1	8698	1
5335	2	5901	2	8781	1
5339	1	5908	3	8782	2
5369	1	5920	1	8789	1
5400	1	5938	1	8799	5
5409	1	5939	4	8809	7
5532	2	5959	1	8810	4
5539	1	5990	25	8811	1
5560	1	6019	1	8820	1
5570	8	6029	1	8839	1
5579	1	6821	1	8849	2
5580	1	6829	1	8870	1
5601	1	6861	1	8880	10
5602	1	6954	1	8902	4
5608	1	7070	6	8903	2
5609	5	7101	1	8909	4
5621	5	7802	2	8920	1
5660	1	7855	6	8939	1

Table (continued)

Distribution of causes of death using 4 digit ICD codes

ICD	Freq.	ICD	Freq.	ICD	Freq.
5679	1	7860	1	9000	1
5698	4	7970	2	9053	1
5699	1	7981	5	9068	1
5710	1	7982	44	9102	1
5712	13	7991	41	9108	3
5713	2	7999	62	9110	4
5714	1	8109	2	9120	2
9138	1	9251	1	9571	1
9190	5	9289	15	9600	1
9192	1	9323	1	9651	1
9198	2	9345	1	9652	1
9199	2	9520	4	9654	7
9220	1	9530	5	9660	2
9221	1	9538	1	9689	2
9222	1	9540	1	9821	4
9229	5	9550	4	9830	1
9239	1	9551	4	9851	1
9240	1	9552	2	9854	2
9250	1	9554	52	9947	1

EXHIBIT

6

Author: Joe Damiano at ~PITCCN2
Date: 4/17/96 2:05 PM
Priority: Normal
TO: Daniel M. Jaffe
TO: James S. Boyt
TO: Patrick R. Atkins
TO: William J. O'Rourke
TO: William E. Snee at ~AMPCCN3
TO: Lee C (ATCX400.LBLAYDEN) Blayden at ~AMSCCSSW
TO: Nancy L. Palazzetti
TO: Larry D. Tanis at ~AMPCCN3
TO: Robert M. James
Subject: Re: Strategic Analysis Session_Badin Works

---------- Message Contents ----------

Bob,

There are numerous strategic (big time) health issues. The following 16 issues apply to Badin, and for that matter USMS and all overseas smelters as well. I'll stop my to discuss in more detail:

1. Ineffective respiratory protection programs as evidenced by poor audit scores. Opportunity to strengthen respiratory protection and save millions of dollars per year if Rockdale / Portland respiratory protection programs are adopted.

2. Engineering control of health hazards - air contaminants. In general we are less well equipped with engineering control of health hazards than our competitors, and more reliant on respiratory protection. I know John Pizzey is sponsoring some engineering projects directed at automation of carbon setting and potskimming. We should be as supportive as possible! OSHA standards and WWHPs require engineering control feasibility assessments. Some relevent points concern:

* Is there good technology sharing in smelting on health hazard controls (e.g. bath covering buckets, siphon cleaning, etc)?
* Health hazard controls will reduce safety hazards (potential for burns, reliance on FR clothing.)
* Health hazard controls will reduce ergonomic risks.
* I could go on and on regarding engineering issues in smelting.

3. Engineering control of noise hazards: No explanation needed.

4. Exposure Assessments: Why are sampling programs so weak in our US smelters?

5. Hearing Conservation in USMS: Does USMS know its incidence of hearing impairments and rate of confirmed threshold shifts?

6. Heat Stress:
--Implementation of new Heat Stress Standard (overtime is an outstanding issue)
--Follow-up on findings from Warrick heat stress study.

--Long term effects of heat exposure on heart disease and injury rates.

7. Chronic obstructive lung disease among potroom workers.

8. Fluoride:
--STEL vs Ceiling limit...regulatory controversy.
--ACGIH biological exposure index of 3 ppm!

9. Compliance with peak exposure limits for hydrogen fluoride and sulfur dioxide. Important to obstructive lung disease issue above as well as carefully targeted respiratory protection and engineering control efforts. Should USMS sponsor research to develop a data-logging personal monitoring device for HF-SO2?

10. Crystalline silica exposure associated with carbon bake and molten metal furnace installation, repair and overhaul. Quartz and cristobalite are IRAC carcinogens.

11. Electromagnetic Field Health Issue: The National Council on Radiation Protection will be issuing a report on static fields this year. Reproductive effects of potroom EMF has been an issue in USMS.

12. Coal Tar Pitch Volatiles:
--Need to reduce Occupational Exposure Limit.
--Dermal absorption as a significant route of exposure
--Hydroypyrene as a biomarker

13. A of A Activities. How much does USMS staff know about:
--Asthma issue in Portland (and Meade Works)?
--Healthwise Study?

14. Technology sharing on health issues outside of Alcoa (USMS involvement with IPAI Health Committee)

15. Neuro-toxicity of aluminium.

16. Management of an aging workforce.

Joe

Reply Separator

Subject: Strategic Analysis Session Badin Works
Author: Robert M. James at ~PITCCN2
Date: 4/16/96 2:51 PM

Pat Atkins asked if I could pinch hit for him on Thursday of this week to go to Badin for a EHS strategic session.I look forward to this opportunity to see where they are in IH/Health issues. Output of this session could have broader implications relative to smelting operations. Would appreciate any issues you would like for me to discuss(EHS management systems, health issues ,etc) in all facets of EHS.Sorry for the short notice. Bob James

EXHIBIT

7

RECEIVED

NORTH CAROLINA INDUSTRIAL COMMISSION

I.C. File No. [redacted]; Employee Plaintiff v. ALCOA, Employer, Defendant.

ADMINISTRATIVE ORDER by Tracey H. Weaver, Executive Secretary

Filed: JUN 21 2001

* *

APPEARANCES

Plaintiff: Wallace and Graham, P.A., Salisbury, North Carolina; Barbara L. Curry, attorney of record.

Defendants: No attorney of record.

* *

THIS CAUSE being heard by the undersigned on Plaintiff's Motion to issue a written Order compelling Defendant to completely answer the discovery previously served upon it by the Plaintiff, and the Commission being of the opinion that the Motion should be allowed;

IT IS THEREFORE ORDERED that Defendant is hereby directed to fully and completely answer the Interrogatories and respond to the Requests for Production within 30 days of this Order.

Pamela McG

~~Tracey H. Weaver~~ Deputy Commissioner
~~Executive Secretary~~

CODE:

PLAINTIFF'S EXHIBIT 10

NORTH CAROLINA INDUSTRIAL COMMISSION

I.C. File No. [redacted], Employee Plaintiff v. ALCOA, Employer and TRAVELERS, Carrier, Defendants.

ADMINISTRATIVE ORDER by Tracey H. Weaver, Executive Secretary

Filed: SEP 19 2001

* *

APPEARANCES

Plaintiff: Wallace and Graham, P.A., Salisbury, North Carolina; Barbara L. Curry, attorney of record.

Defendants: Orbock Bowden Ruark & Dillard, P.C., Winston-Salem, North Carolina; Roger L. Dillard, Jr., attorney of record.

* *

THIS CAUSE being heard by the undersigned Commissioner on Plaintiff's Motion to issue a written Order compelling Defendants to completely answer the discovery previously served upon them by the Plaintiff, and the Commission being of the opinion that the Motion should be allowed;

IT IS THEREFORE ORDERED that Defendants are hereby directed to answer the Interrogatories and respond to the Requests for Production within 30 days of this Order.

Tracey H. Weaver
Executive Secretary

CODE:

NORTH CAROLINA INDUSTRIAL COMMISSION

I. C. NO. [redacted]

[redacted],	Employee, Plaintiff,	ORDER
-v-		BY
ALCOA (Self Insured),	Employer, Defendant.	PHILIP A. BADDOUR III DEPUTY COMMISSIONER

FILED: 2 May 2002

This matter is before the undersigned on Plaintiff's Motion to Bar Defenses, Motion for Sanctions and Attorneys' Fees filed on April 1, 2002. Defendant filed a response on April 10, 2002. Additional arguments were heard at the Pre-Trial Conference in Raleigh, N.C. on April 29, 2002.

APPEARANCES

Plaintiffs: Wallace and Graham, P.A., Attorneys, Salisbury, NC; Mona Lisa Wallace, M. Reid Acree, and Sally McClure Waters, appearing.

Defendant: Orbock Bowden Ruark & Dillard, P.C., Attorneys, Winston-Salem, NC; Roger L. Dillard, Jr. and Mark A. Leach, appearing.

McGuireWoods, LLP, Attorneys, Charlotte, NC; Kimberly Q. Cacheris, appearing.

* * * * * * * * * * *

On September 19, 2001, Executive Secretary Tracey H. Weaver entered an Order compelling discovery in this matter within 30 days. Prior to filing this Motion, Plaintiff's counsel by letter repeatedly requested Defendant to comply with the Commission's Order. At the time of the Pre-Trial Conference on April 29, 2002, Defendant had not provided the discovery responses as previously ordered seven months ago.

THEREFORE, IT IS HEREBY ORDERED that as a result of Defendant's ongoing violation of the Commission's Order compelling discovery, Plaintiff's counsel may depose all persons necessary to obtain answers to Plaintiff's previously submitted interrogatories and to obtain the documents Plaintiff has requested. Questioning in the depositions shall not be limited to the questions posed in the interrogatories.

IT IS FURTHER ORDERED THAT Defendant shall pay all costs involved in the taking of these depositions and production of documents.

IT IS FURTHER ORDERED THAT Defendant shall pay attorneys' fees to Plaintiff's counsel in the amount of $250.00 per hour for Mona Lisa Wallace and $150.00 per hour for one associate attorney for said depositions, including time required to prepare for the depositions. In addition, Defendant shall pay attorneys' fees at said rates for the time required to research and prepare this Motion and for Plaintiff's letters and/or phone calls requesting that Defendant comply with the Commission's Order. Plaintiff shall submit said attorneys' fees to the undersigned for approval in either an itemized form or in an affidavit.

IT IS FURTHER ORDERED THAT this matter shall be reset for hearing in the month of August to allow time for the taking of depositions.

IT IS FURTHER ORDERED THAT Plaintiff's request for sanctions is HELD IN ABEYANCE. The undersigned will consider Defendant's prior and future behavior in this matter when determining whether to award sanctions.

~~No additional costs assessed at this time.~~

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

NORTH CAROLINA INDUSTRIAL COMMISSION

I. C. NO. [redacted]

[redacted], Employee, Plaintiff,

-v-

ALCOA (Self Insured), Employer, Defendant.

ORDER

BY

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

FILED: 2 May 2002

This matter is before the undersigned on Plaintiff's Motion to Bar Defenses, Motion for Sanctions and Attorneys' Fees filed on April 1, 2002. Defendant filed a response on April 10, 2002. Additional arguments were heard at the Pre-Trial Conference in Raleigh, N.C. on April 29, 2002.

APPEARANCES

Plaintiffs: Wallace and Graham, P.A., Attorneys, Salisbury, NC; Mona Lisa Wallace, M. Reid Acree, and Sally McClure Waters, appearing.

Defendant: Orbock Bowden Ruark & Dillard, P.C., Attorneys, Winston-Salem, NC; Roger L. Dillard, Jr. and Mark A. Leach, appearing.

McGuireWoods, LLP, Attorneys, Charlotte, NC; Kimberly Q. Cacheris, appearing.

* * * * * * * * * * *

On June 21, 2001, Deputy Commissioner Pamela T. Young entered an Order compelling discovery in this matter within 30 days. Prior to filing this Motion, Plaintiff's counsel by letter repeatedly requested Defendant to comply with the Commission's Order. At the time of the Pre-Trial Conference on April 29, 2002, Defendant had not provided the discovery responses as previously ordered ten months ago.

THEREFORE, IT IS HEREBY ORDERED that as a result of Defendant's ongoing violation of the Commission's Order compelling discovery, Plaintiff's counsel may depose all persons necessary to obtain answers to Plaintiff's previously submitted interrogatories and to obtain the documents Plaintiff has requested. Questioning in the depositions shall not be limited to the questions posed in the interrogatories.

IT IS FURTHER ORDERED THAT Defendant shall pay all costs involved in the taking of these depositions and production of documents.

IT IS FURTHER ORDERED THAT Defendant shall pay attorneys' fees to Plaintiff's counsel in the amount of $250.00 per hour for Mona Lisa Wallace and $150.00 per hour for one associate attorney for said depositions, including time required to prepare for the depositions. In addition, Defendant shall pay attorneys' fees at said rates for the time required to research and prepare this Motion and for Plaintiff's letters and/or phone calls requesting that Defendant comply with the Commission's Order. Plaintiff shall submit said attorneys' fees to the undersigned for approval in either an itemized form or in an affidavit.

IT IS FURTHER ORDERED THAT this matter shall be reset for hearing in the month of August to allow time for the taking of depositions.

IT IS FURTHER ORDERED THAT Plaintiff's request for sanctions is HELD IN ABEYANCE. The undersigned will consider Defendant's prior and future behavior in this matter when determining whether to award sanctions.

No additional costs assessed at this time.

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

NORTH CAROLINA INDUSTRIAL COMMISSION

I. C. NO. [redacted]

[redacted]	Employee, Plaintiff,	ORDER
-v-		BY
ALCOA (Self Insured),	Employer, Defendant.	PHILIP A. BADDOUR III DEPUTY COMMISSIONER

FILED: 2 May 2002

This matter is before the undersigned on Plaintiffs' Motion received on May 2, 2002 to enforce the Order previously entered regarding the subpoena *duces tecum* to Law Engineering, Law Environmental, and/or Law Gibb. Defendant filed on response on May 2, 2002.

APPEARANCES

Plaintiffs: Wallace and Graham, P.A., Attorneys, Salisbury, NC; Mona Lisa Wallace and M. Reid Acree, Counsel of Record.

Defendant: Orbock Bowden Ruark & Dillard, P.C., Attorneys, Winston-Salem, NC; Roger L. Dillard, Jr. and Mark A. Leach, Counsel of Record.

McGuireWoods, LLP, Attorneys, Charlotte, NC; Kimberly Q. Cacheris, Melissa M. Kemmer, and Ashley D. Tison, Counsel of Record.

* * * * * * * * * * *

After having considered the previous oral and written Orders regarding this matter, and the arguments of all parties, IT IS HEREBY ORDERED:

1. Law Engineering, Law Environmental, or Law Gibb are hereby ordered to provide any documents and records relating to surveys and related documents of the Alcoa Badin plant.

2. Defendant is hereby sanctioned in the amount of $500.00 for interfering with plaintiffs' counsel's attempts to obtain said information, in violation of the Order of the undersigned as stated at the Pre-Trial Conference on April 29, 2002.

3. Defendant's counsel is ordered to instruct Charles Hugart or any person at Law Engineering, Law Environmental, and/or Law Gibb with access to these

PLAINTIFF'S EXHIBIT 14

documents to produce all documents generated in relation to the abovementioned surveys and records immediately in accordance with this Order.

4. Defendant is ordered to cease its obstruction and interference with Law Engineering, Law Environmental, and/or Law Gibb's production of these documents to plaintiffs.

5. Failure of the Defendant to comply with this Order shall subject that party to further serious sanctions.

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

NORTH CAROLINA INDUSTRIAL COMMISSION

I. C. NO. [redacted]

[redacted],
Employee,
Plaintiff,

-v-

ALCOA
(Self Insured),
Employer,
Defendant.

ORDER

BY

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

FILED: 13 May 2002

This matter is before the undersigned on defendant's Motion to Reconsider the Order requiring production of additional documents currently stored at the Alcoa plant in Badin, N.C. Plaintiffs filed a response.

APPEARANCES

Plaintiffs: Wallace and Graham, P.A., Attorneys, Salisbury, NC; Mona Lisa Wallace and M. Reid Acree, Counsel of Record.

Defendant: Orbock Bowden Ruark & Dillard, P.C., Attorneys, Winston-Salem, NC; Roger L. Dillard, Jr. and Mark A. Leach, Counsel of Record.

McGuireWoods, LLP, Attorneys, Charlotte, NC; Kimberly Q. Cacheris, Melissa M. Kemmer, and Ashley D. Tison, Counsel of Record.

* * * * * * * * * * *

After having considered the arguments of all parties, and for good cause shown, IT IS HEREBY ORDERED:

1. Defendant's Motion to Reconsider is DENIED and the parties shall proceed as previously ordered at the hearing on May 10, 2002. Accordingly, plaintiffs' counsel shall be provided access to the files at the Badin plant on Tuesday, May 14, 2002 at any time after 8:00 a.m.

2. Per Chief Deputy Commissioner Steve Gheen, all pending Alcoa cases have been consolidated for hearing before the undersigned, including asbestos cases and "chemical only" cases.

3. Defendant shall cease its obstruction and interference with the production of documents to plaintiffs' counsel as previously ordered.

4. Failure of the defendant to comply with this Order shall subject that party to serious sanctions. Plaintiffs' motion for sanctions is held in abeyance.

5. Considering the urgency of this matter, the parties shall keep the undersigned informed as to the progress of this matter, including any attempt to appeal this discovery Order to the Full Commission.

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

NORTH CAROLINA INDUSTRIAL COMMISSION

I. C. NO [redacted]

[redacted],	Employee, Plaintiff,	ORDER
-v-		BY
ALCOA (Self Insured),	Employer, Defendant.	PHILIP A. BADDOUR III DEPUTY COMMISSIONER

FILED: 28 May 2002

This matter is before the undersigned on various issues heard in Albemarle, North Carolina on May 10, 2002.

APPEARANCES

Plaintiffs: Wallace and Graham, P.A., Attorneys, Salisbury, NC; Mona Lisa Wallace and M. Reid Acree, Counsel of Record.

Defendant: Orbock Bowden Ruark & Dillard, P.C., Attorneys, Winston-Salem, NC; Roger L. Dillard, Jr. and Mark A. Leach, Counsel of Record.

McGuireWoods, LLP, Attorneys, Charlotte, NC; Kimberly Q. Cacheris, Melissa M. Kemmer, and Ashley D. Tison, Counsel of Record.

* * * * * * * * * * *

After having considered the arguments of all parties and the prior Motions and Responses submitted herein, IT IS HEREBY ORDERED:

1. Plaintiffs' counsel is hereby given access to the Alcoa main office in Badin, North Carolina on Monday, May 13, 2002 in order to examine and copy any documents relevant to this litigation. Defendant's counsel may be present in order to object to the production of any documents on the grounds of privilege or work product. Upon such objection, Defendant's counsel is to set aside the documents in question and submit them to the undersigned for *in camera* review. Plaintiffs' counsel may be present while Defendant examines the documents in order to determine if an objection is appropriate. Defendant is ordered not to remove any documents prior to the parties' inspection of the documents.

2. Defendant shall provide to Plaintiffs a copy of the log prepared by LeBoeuf and Lamb of the documents Plaintiffs' counsel obtained in Pittsburgh, Pennsylvania. Plaintiffs

shall then provide to Defendant a list of any documents on the log that Plaintiffs contend should have been previously produced pursuant to discovery. If Defendant objects to providing documents requested by Plaintiffs, Defendant shall produce those documents for an *in camera* review by the undersigned. **However, this Order (paragraph 2) is hereby STAYED pursuant to Defendant's correspondence dated May 23, 2002 requesting that the undersigned conduct an *in camera* evaluation of the logs to determine if said logs are protected by the attorney work product doctrine. Said logs shall be e-mailed to the undersigned immediately for inspection.**

4. Defendant may depose Dr. Lawrence Martin in the [redacted] case but may not introduce his report in evidence because it was not timely provided to Plaintiffs in compliance with the Pre-Trial Order. Both parties have a continuing obligation to supplement discovery prior to each Pre-Trial Order's due date, pursuant to N.C. Rule of Civil Procedure 26. In all future hearings, the parties shall provide expert opinion reports in specific cases prior to the date of the Pre-Trial Agreement regarding experts retained who are expected to testify, and this supplemental information shall include the nature and scope of the witnesses' projected testimony.

5. The undersigned will not reconsider his order of sanctions against defense counsel regarding the Law Gibb subpoena, as defense counsel has shown no good ground for the reconsideration thereof.

6. The undersigned will not reconsider the Commission's order regarding CT scans but denies Plaintiffs' request for attorneys fees for Plaintiffs' counsel's having to respond to Defendant's Motion to Reconsider. The undersigned cautions the parties against moving for reconsideration of orders except under compelling circumstances.

7. In the [redacted] and [redacted] cases, Plaintiffs are to give detailed responses to Defendant's Interrogatory Number Four. The remainder of Defendant's Motion to Reconsider is denied. Defendant is to provide responses to Plaintiffs' Interrogatories Thirteen and Fourteen as to chemical substances and dusts other than asbestos present "in the primary area Plaintiff worked in," rather than "in any area of the plant."

8. The remainder of Z.T. Gibson's testimony may be taken in Raleigh or any other location convenient to both parties and the undersigned on Tuesday, May 28, 2002.

9. Proposed Pre-Trial Agreements are due to the Commission no later than 5 p.m. of the Wednesday prior to each month's hearings. Plaintiffs are to provide their proposed Pre-Trial Agreements to Defendant no later than 5 p.m. of the Wednesday two weeks prior to the hearings, and Defendant is to provide its proposed agreements no later than 5 p.m. of the Monday prior to the hearings. The parties may list the personnel file as a whole without identifying individual pages contained therein. However, out of professional courtesy and so the hearings may proceed expeditiously, it is requested that opposing counsel be made aware of any specific documents that a party plans to

use during a hearing (even though the document has been provided as part of larger group of documents). Plaintiffs are to inform Defendant as soon as possible of any witnesses they are adding in response to Defendant's proposed Pre-Trial Agreement, and Defendant is then to inform Plaintiffs as soon as possible of any witnesses it is adding in response to Plaintiffs' addition(s).

11. Plaintiffs reserve their rights to address the issue regarding Defendants' alleged incomplete production of 607 personnel records, including medical, sickness and accident, and personnel documentation.

12. Defendant is to acquire from LawGibb the name and address of the company that did the assessments and acquired other information at the request of LawGibb for the 1998 survey, particularly including but not limited to the exposure assessment portion of the survey. All of that information shall be acquired by defense counsel from either LawGibb and/or the company that was employed by LawGibb to assist with these assessments and all information acquired shall promptly be provided to plaintiffs' counsel.

13. All persons claiming compensation for attendant care shall prepare a typed chart detailing the claim. It is permissible for plaintiffs' counsel to provide clerical assistance, or other appropriate assistance such as providing the dates of various doctor's appointments, in the preparation of the charts. The claimant shall provide as much detail as possible based upon the claimant's memory or records, including dates of service, hours of service, and the type of service provided. After direct and cross examination of the claimant, the chart may be admitted into evidence at the discretion of the Deputy Commissioner hearing the case. Said charts are for the purpose of limiting the necessity of lengthy testimony regarding the dates, hours, and nature of service provided and are not required to be provided to the defendant prior to the hearing. Defendant shall have a full opportunity to the cross examine the claimant regarding any information on the chart just as if the claimant had provided detailed verbal testimony.

Failure of either party to comply with this Order shall subject that party to sanctions.

PHILIP A. BADDOUR III
DEPUTY COMMISSIONER

BEFORE THE NORTH CAROLINA INDUSTRIAL COMMISSI

I.C. FILE NO.: [redacted] et al., Employee-Plaintiff v. ALCOA (SELF-INSURED), Employer-Defendant.

ORDER BY
PHILIP A. BADDOUR, III
DEPUTY COMMISSIONER

FILED: 27 August 2002

This matter is before the undersigned on various issues heard via conference call on August 13, 2002. During the conference call, verbal orders were given to the parties. Said verbal orders are memorialized in this written Order for purposes of the record.

APPEARANCES

Plaintiffs:	Wallace and Graham, P.A., Salisbury, North Carolina; Mona Lisa Wallace, Sally McClure Waters, and Susan E. Brooks; Appearing
Defendant:	Orbock, Bowden, Ruark & Dillard, P.C., Winston-Salem, North Carolina; Roger L. Dillard, Appearing
	McGuire Woods, L.L.P., Charlotte, North Carolina; Melissa Kemmer, Appearing

After having considered the arguments of all parties and the prior motions and responses submitted herein, IT IS HEREBY ORDERED:

1. The continuation of the global lay testimony previously set for August 26-28, 2002 is hereby postponed, as are the hearings set for the week of September 9, 2002. Global testimony and hearings will not resume until the document production has been completed.

2. The deadlines for Plaintiffs to amend their Form 18B's, as well as for Defendant to conduct additional discovery, will be set after the document production has been completed.

3. By August 21, 2002 Defendant shall produce to the undersigned and Plaintiffs a log of the documents defendant alleges are protected by the attorney-client privilege or the attorney work product doctrine. Defendant shall be as specific as possible in describing the documents to allow plaintiff's counsel an opportunity to respond.

4. The undersigned will conduct an *in camera* review of the materials Defendant maintains are protected by the doctrines of attorney-client privilege and attorney-work product. The question of whether representatives for the parties will be allowed

to be present during the undersigned's *in camera* inspection of the documents has been left open; the parties have until August 23, 2002 to send a statement to the undersigned setting forth the basis for their position regarding the absence or presence of counsel during the *in camera* inspection of the privilege documents.

5. Defendant shall provide Plaintiffs with information contained on Defendant's computerized database including but not limited to its HyGenius database. Specifically, Defendant shall provide all the information applicable to individual Plaintiffs' exposures to any substance and medical monitoring information from this database and additionally shall provide the information sorted by claimants' names, if available. Defendant is to inform Plaintiffs and the Court of the status of the availability of this computerized information by August 23, 2002. Further, Defendant shall advise this Court of its willingness to include in the documents produced information regarding the names and results of air monitoring or testing of materials of non-claimant workers in areas where any of the claimants worked. If Defendant objects to the production of such information, Defendant shall provide a brief citing the basis for its position and plaintiffs' counsel shall be allowed to respond thereto.

6. Defendant shall prepare a log of all materials requested by Plaintiffs during discovery at the Badin plant to which Defendant objects on the basis of relevance. Finding that many of these documents are not yet in the possession of Alcoa, because they in the process of being copied by IKON, the decision to set a deadline for the production of this log will be deferred until such time as Alcoa has the documents.

7. Defendant is to prepare a log of those materials Defendant claims are copyrighted and/or that Defendant argues it should not have to bear the cost of copying. This log must be provided to Plaintiffs and the Court by September 13, 2002.

8. Plaintiffs and Defendant are to make a good faith effort to stipulate to the authenticity of all documents provided by ALCOA. However, if the parties cannot agree to a stipulation, plaintiffs may move for permission to serve Requests for Admissions on Defendant.

PHILIP A. BADDOUR, III
Deputy Commissioner

BEFORE THE NORTH CAROLINA INDUSTRIAL COMMISSION

I.C. FILE NO.: [redacted], Employee-Plaintiffs v. ALCOA (SELF-INSURED), Employer-Defendant.

ORDER BY
GEORGE T. GLENN, II
CHIEF DEPUTY COMMISSIONER

FILED: April 13, 2006

These matters came on for hearing before the Honorable George T. Glenn, II, Deputy Commission, on November 8, 2005 in High Point, North Carolina.

APPEARANCES

Plaintiff: Wallace & Graham, P.A., Salisbury, NC; Mona L. Wallace and Michael B. Pross, Appearing.

Defendant: McGuire Woods, L.L.P., Charlotte NC; C. Ralph Kinsey and J. Mark Langdon, Appearing.

Smith, Helms, Mullis & Moore, L.L.P., Greensboro, NC; Jeri L. Whitfield, Appearing.

The following motions and matters were scheduled for hearing by Deputy Commissioner George T. Glenn, II:

1. Alcoa's Objections to Plaintiff's Supplemental Interrogatories and Request for Production of Documents and Motion for Protective Order dated October 12, 2005.

2. Plaintiff's Supplemental Motion to Compel Alcoa to Provide Better Answers to Plaintiff's First and Supplemental Set of Interrogatories and Request for Production of Documents, and Motion for Sanctions (October 18, 2005; and Plaintiff's First Motion to Compel Alcoa to Provide Answers to Plaintiff's First Set of Interrogatories and Request for Production.

3. Plaintiff's Request for Deputy Commissioner Glenn to Review Alcoa's Privilege Logs and the Documents listed thereon.

Having reviewed the pleadings and heard the arguments of counsel, IT IS HEREBY ORDERED:

1. Alcoa has represented that it will be producing several hundred thousand additional pages of documents defined to include the following:

a. Alcoa is producing from its corporate center in Pittsburgh, and the document storage center that serves such offices, the categories of documents relating to "Coal Tar Pitch," which for purposes of this order shall mean any material capable of producing coal tar pitch volatiles, including coke, calcined coke, coal tar pitch, bitumen; and polycyclic (polynuclear) aromatic hydrocarbons (PAH), benzene soluble fraction (BSF), benzo(a)pyrene/benzo alpha pyrene ("B(a)P" or "BAP"), and 1hydroxypyrenol/urinary pyrenol/1-pyrenol. The category of documents to be produced shall include:

i. Contracts, purchase orders, invoices, receipts, accounts payable ledgers regarding coal tar pitch products used by Alcoa from 1952 to present.
ii. Correspondence (internal and external) regarding coal tar pitch from 1952 to present.
iii. Documents pertaining to or identifying the manufacturers of coal tar pitch from 1952 to present.
iv. Documents pertaining to or identifying the suppliers of coal tar pitch from 1952 to present.
v. Documents pertaining to or identifying the distributors of coal tar pitch from 1952 to present.
vi. Documents pertaining to or identifying Alcoa employees who purchased, procured or obtained coal tar pitch for use from 1952 to present.
vii. Industrial hygiene surveys or inspections, including audits, regarding coal tar pitch from 1952 to present.
viii. Documents regarding the removal of, disturbance of or access to coal tar pitch (include waste manifests) from 1952 to present.
ix. Documents submitted by Alcoa to any local, state or federal governmental agency or organization regarding coal tar pitch from 1952 to present.
x. Documents regarding the equipment, operations and processes in which coal tar pitch was used from 1952 to present.
xi. Documents regarding NESHAPS and coal tar pitch from 1973 to present.
xii. Documents regarding warnings and coal tar pitch.
xiii. Studies and related documents regarding health effects of coal tar pitch.
xiv. Documents relating to health effects of coal tar pitch, in association with renal cell carcinoma/kidney cancer, asthma, bronchitis, dermatitis, and generalized anxiety disorder.
xv. Documents regarding the actions taken by Alcoa with respect to coal tar pitch after Alcoa became aware of any health risks associated with exposure to coal tar pitch.
xvi. Documents regarding the manner in which coal tar pitch was used (e.g., potlining, anode, bakes).
xvii. Documents relating to the planning and implementation of Alcoa's World Wide Health Protocol for Coal Tar Pitch.

b. All documents, and drafts thereof, that relate/reference the kidney cancer follow-up studies of 1993 and 1996; including underlying sampling data, in-house memoranda, internal and external communications and correspondence (including EPA correspondence) relating to the studies. Alcoa will produce any related

documents within the possession of the principal investigators of the 1996 study, Doctors Harvey Checkoway, Mark Cullen and Bruce Alexander.

c. All contracts or written agreements from Alcoa of Australia, Ltd., through which Monash University and The University of Western Australia, is conducting any follow-up to the Healthwise Cancer and Mortality Study dated June 3, 2004, involving company employees in Australia, and any written status reports from the principal university investigators concerning this study as of May 16, 2005, that have been received by Alcoa, Inc. at its corporate center in Pittsburgh, Pennsylvania.

d. All contracts or written agreements from Alcoa Italia, through which the Department of Public Health, Section of Occupational Medicine, University of Cagliari, is conducting a mortality study (initiated through the prior owner of this plant) of company employees who worked at a smelter located in Portovesme, Sardinia, Italy, and any written status reports from the principal university investigators concerning this ongoing study as of May 16, 2005, that have been received by Alcoa, Inc. at its corporate center in Pittsburgh, Pennsylvania.

2. Alcoa has requested additional time to finalize the review and preparation of these documents for production, and has requested that the production deadline for such documents be extended through January 31, 2006. The Court finds Alcoa's request to be reasonable in these cases. Therefore, the Court extends the deadline through January 31, 2006, for Alcoa to complete its voluntary production of coal tar pitch related documents.

3. Alcoa's Motion for a Protective Order requesting the Plaintiff's interrogatory requests be limited to thirty (30) in accordance with Industrial Commission Rule 607, (1) and (3) is DENIED. This is a complex case which reasonably will require additional discovery. The Commission authorizes the Plaintiff to utilize more than thirty (30) interrogatories.

4. The Plaintiff is hereby allowed to ask discovery in excess of thirty (30) questions. The Plaintiff's Supplemental Interrogatories served on September 9, 2005 contains 40 questions (not including subparts) which appear to be targeted to matters relevant to this litigation. Therefore, Defendant is required to submit complete and full responses to the Supplemental Interrogatories by December 8, 2005. Furthermore, the parties are hereby granted permission to serve request for production of documents in all coal tar pitch cases.

5. Defendant shall provide Plaintiff a detailed statement of the basis of the denial of this claim consistent with the requirements of N.C.G.S. 97-18 and Industrial Commission Rule 601. The detailed statement of the basis of denial shall set forth a statement of the facts, as alleged by the employer, concerning the injury or any other matter in dispute; a statement identifying the source, by name or date and type of document, of the facts alleged by the employer; and a statement explaining why the facts, as alleged by the employer, do not entitle the employee to workers' compensation benefits.

6. The parties agree that if any of the produced documents contain confidential personal information, such as social security numbers, wages, medical information, etcetera, of Alcoa employees, former employees, and their family members who are not represented by Wallace and Graham, then such information should be kept confidential and the document may not be utilized until the confidential information is redacted.

7. Alcoa shall produce a privilege log to Plaintiff's counsel regarding this production no later than February 27, 2006. Should Plaintiff disagree with any items appearing on Alcoa's privilege log, the Plaintiff shall specify to Defendant the specific matters upon which there is disagreement to enable the parties to attempt to reach a good faith resolution of the dispute. If the parties are unable to resolve the dispute after meeting and conferring in good faith, then the documents in question shall be submitted to the undersigned for an *in camera* review.

8. Defendant has produced thousands of documents to Plaintiff's counsel since April 2005. To date, the Defendant has produced 2 separate privilege logs to Plaintiff's counsel regarding the documents produced. The parties are HEREBY ORDERED to meet and discuss these logs by January 31, 2006 to try to reach an agreement and to eliminate any documents that do not contain the attorney client or work product privilege. The Defendant is to categorize these documents by designating which documents constitute correspondence by and to an attorney only; correspondence from adjustors and supervisors when responding to questions submitted by the attorneys; communications dealing with strategies of defense in these cases; and finally, communications to and from the Defendant's attorneys in these cases involving their representation of the Defendant. Upon completion of the review of the logs by the parties, the Defendant is to submit any document that a privileged is claimed therein to the undersigned for an *in camera* review no later than January 31, 2006 or as allowed by the undersigned to determine if a privilege does exist.

9. The Undersigned has directed the parties to mediate this case. Accordingly, the parties have agreed to request Lynn Gullick to mediate this case. The parties have scheduled the mediation of this claim for May 1 and May 2, 2006. Should it appear that the parties are unable to resolve the claim, then the claim will be scheduled for hearing before a member of Deputy Commissioner Glenn's team, which currently consists of Deputy Commissioner Glenn, Deputy Commissioner Wanda Scott Taylor, and Chief Deputy Commissioner Stephen Gheen. The claim will be scheduled for hearing at the nearest location to Albemarle and can be scheduled with approximately thirty (30) days notice to the Commission.

10. The Undersigned, in his discretion, at this time reserves making any ruling on or entering any Order in connection with Alcoa's Motion for a Protective Order with respect to Defendant Alcoa having to respond further to Plaintiff's Supplemental Request for Production of Documents and Plaintiff's Supplemental Motion to Compel Alcoa to Provide Betters Answers to Plaintiff's Supplemental Request for Production of Documents until the completion of the coal tar document production, scheduled to be completed by January 31, 2006. Entering an Order prior to the completion of the document production is premature before allowing Plaintiff's counsel to determine if the production is sufficient.

11. The Undersigned, in his discretion, at this time reserves making any ruling on or entering any Order in connection with Plaintiff's Motion for Sanctions until completion of the coal tar pitch production and Defendant's subsequent discovery responses have been provided.

12. Defendant's request that Plaintiff's counsel be placed under an Order limiting or restricting the use of discovery produced herein is DENIED.

GEORGE T. GLENN II
DEPUTY COMMISSIONER

EXHIBIT

8

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

----------X

MARGARET GEORGE, RACHEL GEORGE, Individually and as Natural Guardian of MARK GEORGE, AUTUMN A. LEAF, ANN Y. LEAF, VICKY BENEDICT, HELEN BENEDICT, DAWN A. BERO, SHAWNA A. BERO, THERESA BURNS, JULIUS J. COOK, BETTY A. DAVID, IETSISTOHKWARORORKS, a/k/a Iegee, BIANCA J. JACOBS, JEAN JACOBS, THERESA JACOBS, Individually and as Natural Guardian of FERYN KING, GORDON KING, MARY JACOBS, KAHAWANION DAVID, KARONHIOTHA SHARROW, KANIETEHEWI SHARROW, DAWN LAFRANCE, Individually and as Natural Guardian of BRETTANI LAFRANCE, BRENDA LAFRANCE,KERRY R. MITCHELL, KORA MITCHELL, TINA MITCHELL, Individually and as parent and Natural Guardian of CHAD GARROW, SARAH BENEDICT, Individually and as Parent and Natural Guardian of KAWEHRAS BENEDICT, JAZMINE BENEDICT, LUZ BENEDICT, ANNA THOMPSON, DULSIE THOMPSON, ERIC THOMPSON, HARRY THOMPSON, JUDITH L. THOMPSON, LORAN THOMPSON, OREN L. THOMPSON, TINA THOMPSON, Individually and as Parent and Natural Guardian of ALEXIS ARQUETTE, ELIZABETH BENEDICT, Individually and as Administratrix of the Estate of EDWIN BRUCE BENEDICT, and JOHN DOES and JANE DOES (Nos "1 to unknown") on behalf of themselves and all other persons similarly situated,

Plaintiffs,

-against-

GENERAL MOTORS CORPORATION and ALCOA, INC..,

Defendants.

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CLASS ACTION COMPLAINT

TRIAL BY JURY DEMANDED
Index No.

Plaintiffs, individually and on behalf of all others similarly situated, by and through their attorneys, Dreyer Boyajian LLP, as and for their complaint against defendants, allege as follows:

I. NATURE OF THE ACTION

1. This is a class action brought by individual Mohawk Indians to recover money damages for personal injuries they have sustained and are at risk of sustaining as a result of their exposure to polychlorinated biphenyls ("PCBs") disposed of by defendants.

2. Plaintiffs reside on the Akwesasne Territory, a Mohawk Indian reservation located on the St. Lawrence River that occupies approximately 28,000 acres in the State of New York in the United States and the Provinces of Ontario and Quebec in Canada.

3. Defendants own and operate manufacturing facilities located in St. Lawrence County, New York, in close proximity to Akwesasne. As part of their manufacturing operations, defendants disposed of PCBs which were released into groundwater, surface water, air, soil and sediments at and in the vicinity of Akwesasne.

4. As a result of defendants' disposal of PCBs and the release of those PCBs into the environment, portions of the St. Lawrence, Raquette and Grasse rivers adjacent to and in close proximity to Akwesasne have been and continue to be contaminated with PCBs, and fish in those rivers have been and continue to be contaminated with PCBs.

5. Plaintiffs have been exposed to defendants' PCBs through a common pathway: consumption of PCB-contaminated fish from the St. Lawrence, Raquette and Grasse rivers.

6. As a result of their exposure to defendants' PCBs, Plaintiffs have suffered and continue to suffer injury as evidenced by cellular and subcellular changes which place plaintiffs at greater risk of contracting diseases and conditions that have been linked to PCB exposure.

II. PARTIES

7. Plaintiffs are individuals who reside on the Akwesasne Territory in either the United States or Canada and have been exposed to defendants' PCBs. None of the plaintiffs are residents of the states of Delaware, Michigan, or Pennsylvania.

8. Defendant General Motors Corporation ("GM") is a corporation organized under the laws of the state of Delaware, with its principal place of business located in Detroit, Michigan.

9. Defendant Alcoa, Inc. ("Alcoa") is a corporation organized under the laws of the state of Pennsylvania, with its principal place of business located in Pittsburgh, Pennsylvania. Alcoa is successor in interest to Reynolds Metals Company by virtue of a merger that occurred in or about May 2000 and, upon information and belief, as a result thereof assumed liability with respect to all acts and omissions of Reynolds Metal Company relevant to the claims herein. As used herein, "Alcoa" refers to both Alcoa, Inc. and its predecessor in interest, Reynolds Metals Company.

III. JURISDICTION AND VENUE

10. This court has jurisdiction pursuant to 28 U.S.C. §§ 1332(a)(1), 1332(a)(2) and 1332(a)(3). Given the number of individual and class plaintiffs, the nature and extent of injuries suffered, and the forms of relief sought herein, the amount in controversy exceeds seventy-five thousand dollars ($75,000) per individual claimant, and with respect to the class as a whole exceeds five million dollars ($5,000,000.00).

11. Venue is proper in the Northern District of New York pursuant to 28 U.S.C. § 1391(a).

IV. FACTS

Akwesasne

12. The Akwesasne Mohawk community, also known as the St. Regis Mohawk Indian Reservation, straddles the border between the United States and Canada along the St. Lawrence River. Akwesasne encompasses approximately 28,000 acres, or about fifty square miles, and includes portions of St. Lawrence and Franklin Counties in New York State, and the provinces of Quebec and Ontario in Canada.

13. The territory of Akwesasne has long played a role in the lives of the Mohawk people. In the Mohawk language, Akwesasne means "place of partridges," or "where the partridge drums," a reference to the abundance of this bird along the shores of the St. Lawrence River and its tributaries. For centuries, the Mohawk people frequented the area to fish, hunt and trade.

14. Permanent settlement of Akwesasne occurred in or about 1747, when the Roman Catholic mission of St. Regis was established on a portion of Akwesasne where the Raquette and St. Regis rivers join the St. Lawrence River. The proximity of Akwesasne to the St. Lawrence, Raquette, Grasse and St. Regis rivers resulted in Mohawk dependence on fish from those rivers for survival.

15. Subsistence fishing has long provided a substantial portion of the diet of Mohawk people living at Akwesasne.

16. Akwesasne is currently home to approximately 12,000 Mohawks.

The GM Facility

17. The General Motors Powertrain Facility ("GM Facility") is located in the Town of Massena, Franklin County, New York.

18. The GM Facility is a 270-acre industrial complex bounded on the north by the St. Lawrence River, on the east by Akwesasne, on the south by the Raquette River, and on the west by property owned by Alcoa and Conrail.

19. The eastern portion of the GM Facility is directly adjacent to and contiguous with the western border of Akwesasne.

20. The GM facility is located directly upstream of Akwesasne on the St. Lawrence River.

21. Upon information and belief, the GM Facility manufactures engine components for General Motors products.

22. Upon information and belief, operations at the GM Facility began in 1959.

The Alcoa East Smelter Plant

23. The Alcoa East Smelter Plant ("Alcoa East Plant") is located in the Town of Massena, St. Lawrence County, New York.

24. The Alcoa East Plant was constructed in or about 1958 for the purpose of producing aluminum from alumina (aluminum oxide).

25. The Alcoa East Plant was formerly owned and operated by Reynolds Metals Company, and was formerly known as the St. Lawrence Reduction Plant. In or about May 2000, Reynolds Metals Company merged with Alcoa. Since that time, and continuing up to the present, the Alcoa East Plant has been owned and operated by Alcoa.

26. The Alcoa East Plant is located on an approximately 1600 acre parcel of land which is bounded on the north by the St. Lawrence River; on the east by Conrail, on the south by the Raquette River, and on the west by Haverstock Road (South Grasse River Road).

27. Plant buildings and appurtenances at the Alcoa East Plant occupy approximately

112 acres.

28. A large tract of New York State-regulated wetlands (Wetland RR-6), approximately 172 acres in size, is located on the Alcoa East Plant.

29. The Alcoa East Plant is located approximately 0.5 miles west and directly upstream of Akwesasne on the St. Lawrence River.

The Alcoa Massena Facility

30. The Alcoa Massena Operations Facility ("Alcoa Massena Facility") is an aluminum and aluminum product manufacturing facility located in the Town of Massena, St. Lawrence County, New York.

31. Upon information and belief, Alcoa began operations at the facility in or about 1903.

32. The Alcoa Massena Facility encompasses approximately 3,500 acres and is bordered on the north by the St. Lawrence River; on the south and southwest by the Massena Power Canal, which is tributary to the Grasse River; and on the south and southeast by the Grasse River, which is tributary to the St. Lawrence River.

33. The Alcoa Massena Facility is located approximately eight miles west and directly upstream of Akwesasne on the St. Lawrence River.

Disposal of PCBs at the GM Facility

34. As part of its industrial operations, GM disposed of PCBs at several locations at and near the GM Facility, including the areas identified by GM as the North Disposal Area; the East Disposal Area; the Industrial Landfill; the 10 Million Gallon Lagoon; the 1.5 Million Gallon Lagoon; the 500,000 Gallon Lagoon; and the 350,000 Gallon Lagoon. GM also disposed of PCBs in the St. Lawrence River and the Raquette River, and on Akwesasne Territory.

35. During the 1960s, GM routinely dumped PCB-contaminated fluids into the 1.5 Million Gallon Lagoon. PCB-contaminated liquids from the Lagoon were discharged into the St. Lawrence River.

36. In or about 1976, a wastewater treatment plant was installed at the GM Facility. As part of that system, PCB-contaminated wastewater was sent to the 350,000 Gallon Lagoon for solids settling. Treated water from the wastewater treatment plant was pumped to the 500,000 Gallon Lagoon and the 10 Million Gallon Lagoon for eventual reuse as plant process water. PCB-contaminated liquids from these Lagoons were released into the St. Lawrence River.

37. GM disposed of PCB-contaminated sludges from the Lagoons, PCB-contaminated foundry sand, and other process wastes contaminated with PCBs at the Industrial Landfill. Beginning in approximately 1976, GM also began disposing of PCB-contaminated sludge from its wastewater treatment plant in the Industrial Landfill.

38. GM disposed of PCB-contaminated sludges and PCB-contaminated hydraulic fluid, among other things, in the East Disposal Area. Beginning in approximately 1976, GM also began disposing of PCB-contaminated sludge from its wastewater treatment plant in the East Disposal Area.

39. In approximately 1971, approximately 800,000 gallons of PCB-contaminated sludge were removed from two of the waste lagoons and disposed of in the North Disposal Area.

40. In 1975, an earthen berm constructed by GM to contain the wastes disposed of in the East Disposal Area collapsed, resulting in the release of PCB-contaminated wastes, including PCB-contaminated petroleum, to Turtle Creek Cove on Akwesasne Territory and to other Akwesasne lands.

41. After the collapse of the berm, GM continued to utilize the East Disposal Area for

disposal of its PCB-contaminated wastes.

42. Upon information and belief, GM also directly disposed of PCBs in the Raquette River and the St. Lawrence River.

Disposal of PCBs at the Alcoa East Plant

43. As part of its industrial operations, Alcoa disposed of PCBs at several locations at and near the Alcoa East Plant, including the areas identified by Alcoa as the Black Mud Pond; the Solid Waste Landfill; the Former Potliner Storage Area; the North Yard; the Potliner Pad; and a number of drainage ditches and outfalls.

44. The Black Mud Pond was constructed in 1973 in an unlined borrow pit on the west side of the Alcoa East Plant. The pond had a surface area of approximately 6 acres and a capacity of approximately 20 million gallons prior to its closure in 1996. During some or all of the period of its operation, Alcoa disposed of PCB-contaminated wastes in the Black Mud Pond.

45. The Solid Waste Landfill became operational in or about 1957, and consists of an unlined landfill approximately 11.5 acres in size located near the southwest corner of the East Plant. From 1957 to 1990, Alcoa disposed of PCB-contaminated materials, including PCB-contaminated sewage sludge, in the Landfill. The Former Potliner Storage Area is located in the eastern portion of the Landfill.

46. Prior to 1984, most surface water run-off from the Landfill/Potliner area discharged directly to a portion of Wetland RR-6 at the Alcoa East Plant. Leachate seeps which formed in the northwest corner of the Landfill overflowed the containment berm and discharged to Wetland RR-6 via a nearby small stream.

47. The North Yard was the location of the Heat Transfer Medium (HTM) system, which was used to maintain the temperature and fluidity of the coal tar pitch for anode and

cathode manufacturing. PCB fluids were used in the HTM system, and leakage from this system was the source of PCB contamination in the North Yard.

48. The Potliner Pad Area was used to temporarily store spent potliner material prior to crushing. Upon information and belief, PCB-contaminated run-off from the Potliner Pad flowed to a small drainage ditch which discharged to the St. Lawrence River.

49. Prior to construction of partial surface-water runoff controls and a leachate collection system for the Landfill area, PCB-contaminated leachate, ground water, and surface water from the Landfill area discharged directly to Wetland RR-6. Upon information and belief, the Wetland also received PCB-contaminated sediment and surface water which drained from other areas of the facility.

50. Upon information and belief, outfalls at the Alcoa East Plant discharged PCB-contaminated wastewater and surface water runoff from the Facility to the St. Lawrence River.

51. Outfall 001 collected stormwater runoff from the main plant and from various process system discharges and discharged directly to the St. Lawrence River. Upon information and belief, the discharges from Outfall 001 were contaminated with PCBs.

52. Outfall 002 collected stormwater runoff from about 13 acres of the Facility and various process water discharges. This outfall consisted of a channelized surface flow which discharged directly to the St. Lawrence River. Prior to 1989, the discharge traveled down an open ditch at the Facility to enter the St. Lawrence River. After 1989, this discharge was combined with Outfall 003. Upon information and belief, the discharges from Outfall 002 were contaminated with PCBs.

53. Outfall 003 collected discharges from the plant's sanitary sewer system and two sewage treatment plants, and discharged directly into the St. Lawrence River. The discharges

from the sewage treatment plants included wastewaters contaminated with PCBs. Upon information and belief, the discharges from Outfall 003 were contaminated with PCBs.

54. Outfall 004 consisted of a drainage ditch collecting discharges from three diked areas in the North Yard. Drainage from these areas flowed along a flat area north of the dikes before entering the ditch alongside South Grasse River Road, and then flowed easterly to a culvert discharging directly into the St. Lawrence River. Upon information and belief, the discharges from Outfall 004 were contaminated with PCBs.

55. Upon information and belief, Alcoa also directly disposed of PCBs from the Alcoa East Plant into the Raquette River and the St. Lawrence River.

Disposal of PCBs at the Alcoa Massena Facility

56. As part of its industrial operations, Alcoa disposed of PCBs at several locations at and near the Alcoa Massena Facility, including the areas identified by Alcoa as the Dennison Road site; the Oily Waste Landfill; the Primary Lagoon; the Dredge Spoils Area; the Soluble Oil Lagoon; the West Marsh; the Unnamed Tributary; the HPM Press Area; the Waste Lubricating Oil Lagoon; the General Refuse Landfill; the Landfill Annex; the Sanitary Lagoon; the 60-Acre Lagoon; the East Marsh; Storage Tank No. 51; the West Fill Area; and various unpaved plant roads.

57. The Dennison Road site is approximately 0.75 acres in size and is located near the southeast corner of the Alcoa Massena facility in a ravine that was formed by dredge sediments from the Grasse River. From approximately 1969 to 1979, the Dennison Road site was used for disposal of drums containing PCB-contaminated waste oil, sludges, degreasers, and degreaser still bottoms.

58. The Oily Waste Landfill was opened in 1979 as a replacement for the Dennison

Road site. The Landfill, approximately one acre in size, consists of two unlined disposal pits and two "dewatering" pits. The disposal pits received drums of PCB-contaminated oily sludges, rags, and debris from the Facility. The two disposal cells were closed in 1982 and 1984, respectively. The "dewatering" pits were used for disposal and solidification of PCB-contaminated lubricating oils and sludges. These pits were closed in 1984.

59. The Primary Lagoon and Dredge Spoil Area have a combined area of approximately 5.3 acres. The Primary Lagoon is an unlined lagoon which was excavated in 1972 to serve as a settling basin for process wastewaters and facility run-off, which, upon information and belief, were contaminated with PCBs. The Lagoon was dredged in 1977, and PCB-contaminated sludge from the dredging operation was placed in the Dredge Spoils Area adjacent to the Primary Lagoon.

60. The Soluble Oil Lagoon is an unlined lagoon 2.8 acres in size and approximately eight feet deep. It operated from 1959 to 1986. The lagoon was used for the disposal of, among other things, PCB-contaminated waste oil.

61. The Waste Lubricating Oil Lagoon is an unlined 1.3 acre lagoon which at one time contained about 19,000 cubic yards of PCB-contaminated sludge. The lagoon was opened in 1969 and was a temporary storage basin for PCB-contaminated waste lubricating oils, grease, and oil skimmed off the adjacent Soluble Oil Lagoon.

62. The 60-Acre Lagoon received storm water run-off and process cooling waters from manufacturing areas at the Facility which, upon information and belief, were contaminated with PCBs.

63. The Sanitary Lagoon is 18 acres in size and served as a settling pond for site-wide sanitary wastewater and process water which, upon information and belief, was contaminated

with PCBs.

64. The West Marsh is approximately three acres in size and is located southeast of the Facility's Ingot Extrusion area, northwest of the Fabricating Area, and adjacent to the General Refuse Landfill Annex. Upon information and belief, PCB-contaminated wastes from other areas of the Alcoa Massena Plant migrated, drained, or were discharged into the West Marsh.

65. The Unnamed Tributary is located east of Outfall 002 on the Alcoa Massena Facility property. Upon information and belief, PCB-contaminated stormwater from the Facility's smelting operation discharged through the Outfall 002 pipe to the Unnamed Tributary, which in turn discharged into the Grasse River.

66. The General Refuse Landfill encompasses 22 acres. Groundwater flow at the General Refuse Landfill is to the south-southeast toward the East Marsh.

67. The Landfill Annex encompasses 5 acres. Groundwater flow at the Landfill Annex is to the south-southwest toward the West Marsh.

68. Upon information and belief, PCB-contaminated wastes were disposed of in both the General Refuse Landfill and the Landfill Annex.

69. The East Marsh received surface water discharges from the West Marsh via a pipe beneath the General Refuse Landfill, and received surface water run-off from the General Refuse Landfill and the Soluble Oil Lagoon. Upon information and belief, those discharges and the run-off were contaminated with PCBs.

70. Storage Tank No. 51 was a 70,000 gallon underground concrete vault constructed in or around 1941. It was originally used as a wet well for soluble oils that were used in a nearby rolling mill. Subsequently, the vault was used to store soluble oils, as well as sediment and liquid that had been cleaned out of fuel oil tanks. Upon information and belief, the oils and other

wastes were contaminated with PCBs.

71. The HPM Press Area was a collection of buildings that served primarily to house hydraulic presses. The hydraulic fluids used in the presses contained PCBs and, upon information and belief, leakage of those fluids contaminated the HPM Press Area with PCBs.

72. The West Fill Area is a 25 acre unlined landfill located in the western portion of the Alcoa Massena Facility. This landfill was used for disposal of industrial wastes, including PCB-contaminated wastes, between 1942 and 1954.

73. Through the 1950s, 1960s, and 1970s, several miles of unpaved roads were treated with PCB-contaminated oil from the Waste Lubricating Oil Lagoon and other sources of PCB-contaminated waste oil.

74. Outfalls 001, 004, 005, and 007 at the Alcoa Massena Facility discharged directly to the Grasse River. Outfall 003 discharged directly to the Massena Power Canal. Outfall 002 discharged directly to an unnamed tributary to the Grasse River. Upon information and belief, the discharges from some or all of these outfalls were contaminated with PCBs.

75. Upon information and belief, Alcoa also directly disposed of PCBs from the Alcoa Massena Plant into the Grasse River and St. Lawrence River.

PCB Contamination of Akwesasne, the St. Lawrence River, the Raquette River, the Grasse River, and Associated Ecosystems

76. The PCBs disposed of by defendants were released into the environment, including groundwater, surface water, air, soil, and sediments at, in, and adjacent to Akwesasne, the St. Lawrence River, the Racquette River, the Grasse River, and associated ecosystems.

77. The PCBs disposed of defendants and released into the environment contaminated groundwater, surface water, air, soil, sediments, fish and wildlife at, in, and adjacent to

Akwesasne, the St. Lawrence River, the Racquette River, the Grasse River, and associated ecosystems.

Plaintiffs' Exposure to Defendants' PCBs

78. Human exposure to PCBs may occur through, among other things, consumption of contaminated biota.

79. Plaintiffs have been exposed to PCBs disposed of by defendants by consuming fish contaminated with PCBs, or via in utero transfer and/or consumption of breast milk from mothers who consumed PCB-contaminated fish.

Adverse Health Effects Associated with PCB Exposure

80. PCBs are listed by the U.S. Environmental Protection Agency and the International Agency for Research on Cancer as a probable human carcinogen. This classification means that there is sufficient evidence to show that PCBs cause cancer in animals, and that there is evidence that PCBs cause cancer in humans.

81. Human health studies indicate that PCBs adversely affect reproductive function. PCBs affect a variety of liver enzymes which are capable of altering the female hormone estrogen and other estrogenic chemicals. Maternal exposure to PCBs can result in decreased gestational age and reduced birth weight of offspring.

82. PCBs adversely affect neurobehavioral and cognitive development. Infants exposed to PCBs in utero or via breast milk may experience neurobehavioral deficits including, among other things, depressed responsiveness, impaired visual recognition, poor short-term memory, deficiencies in psychomotor development, and reduced performance on visual recognition-memory tests.

83. Exposure to PCBs during fetal development and early childhood can result in

neurologic injury resulting in, among other things, an irreversible reduction in intelligence and alteration of behavior.

84. PCBs are also associated with adverse effects on thyroid function in adults and children and on immunological function. PCB-induced immunosuppression is associated with increased rates of infections, and respiratory disease.

85. Children are particularly sensitive to the effects of PCBs on neurological development, immune system function, and thyroid function. Thyroid hormones are essential for normal brain development. PCBs have been shown to alter thyroid function during critical periods of brain development.

86. Exposure to PCBs is associated with adverse effects on human metabolism. PCBs cause hormonal effects that affect both insulin secretion and thyroid gland function, resulting in alterations of serum lipids, increased incidence of hypertension, and diabetes.

87. At high doses, PCBs can cause liver enlargement, fatty degeneration, hepatocellular necrosis (cell death), and changes in the bile duct.

Plaintiffs' Injuries

88. The presence of PCBs has been documented in the blood, fat, tissue and breastmilk of Mohawk people residing at Akwesasne.

89. All plaintiffs have clinically demonstrable presence of PCBs in their body and/or an illness, disease or condition associated with exposure to PCBs.

90. As a result of their exposure to PCBs, Mohawk people residing at Akwesasne are at an increased risk of a variety of adverse health effects associated with such exposure including, but not limited to, cancer; endocrine disorders, developmental and reproductive abnormalities; effects on skin and hair, including accelerated growth of cells in hair follicles of the skin and

formation of keratinous plugs, resulting in chloracne; skin swelling, rashes and pigmentation abnormalities of skin and nails; impairment of liver function, including altered breakdown rate of the female hormone estrogen, resulting in abnormalities in sexual and reproductive development; altered formation of cholesterol and other lipids in liver and serum, resulting in increased liver diseases, cardiac disease and hypertension; liver enlargement, fatty degeneration, hepatocellular necrosis (liver cell deaths) and changes in the bile duct; impairment of the immune system; disruption of thyroid functions, resulting in hypothyroidism, reduction in intellectual capacity, and behavioral changes; hearing loss; interference with development of reproductive organs in males, and other adverse impacts on the male reproductive system; abnormal growth and development in children; diabetes; and more frequent and severe infections.

91. Plaintiffs have suffered personal injuries and economic loss as a result of defendants' tortious and wrongful acts.

Class Action Allegations

92. Plaintiffs bring this action pursuant to Rule 23 of the Federal Rules of Civil Procedure on behalf of themselves and as a class on behalf of all other similarly situated individuals.

93. The proposed plaintiff class that plaintiffs seek to represent is defined as all natural persons (a) who have resided within the geographical boundaries of the Akwesasne Territory; (b) who have been exposed to PCBs disposed of by defendants via consumption of PCB-contaminated fish from the St. Lawrence, Grasse or Raquette rivers, or via in utero transfer and/or consumption of breastmilk from mothers who consumed such fish; and (c) who have sustained personal injury as a result of such exposure.

94. Plaintiffs also propose a medical condition sub-class defined as those persons

within the class with a manifested illness, disease or condition associated with exposure to PCBs resulting in a medical diagnosis and treatment of such illness, disease or condition.

95. Plaintiffs also propose a monitoring sub-class defined as those persons within the class who have a clinically demonstrable presence of PCBs in their body, but have not manifested an illness, disease or condition associated with exposure to PCBs.

96. Members of the class are so numerous that joinder is impracticable. The proposed class consists of thousands of class members who have resided at Akwesasne, who have consumed PCB-contaminated fish or whose mothers consumed such fish, and who have sustained a personal injury as manifested by having a clinically demonstrable level of PCBs present in their bodies. The identities of members of the class are ascertainable through, among other things, objective medical testing showing the presence of PCBs.

97. Common questions of law and fact exist which predominate over individual questions of law and fact and which affect members of the proposed class.

98. These common legal and factual questions include, among other things:

a. Whether defendants negligently disposed of PCBs at their respective facilities;

b. Whether plaintiffs were exposed to defendants' PCBs via consumption of PCB-contaminated fish or via in utero transfer and/or consumption of breastmilk from mothers who consumed PCB-contaminated fish;

c. Whether plaintiffs who have been exposed to PCBs disposed of by defendants and who have clinically demonstrable PCBs in their blood have suffered a present personal injury in the form of cellular and subcellular changes, regardless of any other physical manifestation of illness;

d. Whether defendants' conduct constitutes gross negligence, recklessness and/or wantonness warranting punitive damages;

e. Whether defendants' disposal of PCBs constitutes an abnormally dangerous, ultrahazardous and inherently or intrinsically dangerous

activity for which they are strictly liable to plaintiffs;

f. Whether defendants have intentionally inflicted emotional distress on each plaintiff by knowingly and willfully disposing of PCBs into the environment without advising plaintiffs of the serious dangers imposed thereby;

g. Whether defendants are strictly liable, pursuant to Navigation Law § 181(1), for all direct and indirect damages sustained by plaintiffs as a result of defendants' discharge of PCB-contaminated petroleum;

h. Common defenses asserted by defendants; and

i. Use and application of experts, defendants' employees, and governmental witnesses and documents.

99. Plaintiffs' claims are typical of those of each Class Member because Plaintiffs, like every other Member of the Class, have consumed PCB-contaminated fish or their mothers consumed such fish, and seek the same relief under the same causes of action as the other Members of the Class.

100. Plaintiffs are adequate representatives of the Class because their interests do not conflict with the interests of the Members of the Class they seek to represent; they have retained counsel competent and experienced in class action litigation and complex environmental litigation; and they intend to prosecute this litigation vigorously.

101. Plaintiffs and their counsel will fairly and adequately protect the interests of the Members of the Class.

102. This action is certifiable under the provisions of FRCP 23(b)(1)(A) and/or (B) and/or (b)(3) because:

(A) Individual litigation presents a potential for inconsistent or contradictory Judgments on important threshold questions such as the reasonableness of defendants' conduct, causation, the application of law, and use of discovery.

(B) The adjudication of the relevant issues will as a practical matter be dispositive of the interest of other class members not party to the adjudication, or substantially impair or impede such class members' ability to protect their interests, again referring to the issues set forth above and ultimate questions of law and fact.

(C) The class action is superior to other available means for the fair and efficient adjudication of the claims of Plaintiffs and the Class. Individualized litigation increases the delay and expense to all parties and the court system presented by the legal and factual issues raised by defendants' conduct. By contrast, the class action will result in substantial benefits to the litigants and the court by allowing the court to resolve numerous individual claims based upon a single set of proofs in a case where the individual cost of litigating these claims would make class action litigation more economical and cost-effective than individual litigation.

Defendants' Conduct: Aggravating Circumstances

103. At all times relevant hereto, defendants knew or should have known that PCBs are potentially toxic to fish, wildlife and humans.

104. At all times relevant hereto, defendants knew or should have known that PCBs released into the environment pose a substantial risk of contaminating fish, wildlife and humans.

105. At all times relevant hereto, defendants knew or should have known that Mohawks residing at Akwesasne engaged in subsistence fishing, and that such fishing comprised a substantial portion of the Mohawk diet.

106. Upon information and belief, defendants knew or should have known that their PCBs were contaminating fish consumed by Mohawks residing at Akwesasne, but failed to warn them of the contamination, and intentionally persisted in disposing of PCBs in a manner certain to continue contamination of fish consumed by the Mohawk people, including plaintiffs.

107. At all times relevant hereto, defendants knew or should have known that men, women and children residing at Akwesasne were placed at considerable risk as a result of

defendants' disposal of PCBs.

108. At all times relevant hereto, defendants knew or should have known that disposal of PCBs and PCB-contaminated wastes was subject to regulation by federal and/or state laws and regulations.

109. Upon information and belief, defendants' disposal of PCBs was in contravention of applicable federal and/or state laws and regulations.

110. Defendants' disposal of PCBs was wilful and intentional, wanton, malicious, conducted with reckless indifference to the consequences thereof, and/or constituted intentional and deliberate wrongdoing.

Required Commencement Date

111. The PCBs disposed of by defendants and released from defendants' facilities into the environment are "hazardous substances, pollutants or contaminants" as defined by the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601, *et seq.*

112. In the factual allegations and counts in this Complaint, Plaintiffs assert claims under common law and statutory law for personal injury, which are caused or contributed to by exposure to PCBs, which are a hazardous substance, pollutant or contaminant as defined by CERCLA, and that were released into the environment from the defendants' facilities.

113. Pursuant to 42 U.S.C. § 9658, if the accrual date for any applicable statute of limitations for any of Plaintiffs' state law claims is earlier than the federally required commencement date, the federally required commencement date governs Plaintiffs' claims.

114. To the extent, if any, that any statute of limitations applies to Plaintiffs' claims, each Plaintiff discovered less than three years prior to the filing of this Complaint the existence

of his or her injury.

115. Alternatively, even with the exercise of reasonable diligence, each Plaintiff could not have discovered less than one year prior to the filing of this Complaint that his or her personal injury was caused or contributed to by the release of PCBs into the environment from defendants' facilities.

116. Plaintiff Estate Representatives discovered less than two years prior to the filing of this Complaint that the deaths of their decedents were caused or contributed by the release of PCBs into the environment from defendants' facilities. Even with the exercise of reasonable diligence, plaintiff Estate Representatives could not have discovered less than two years prior to the filing of this Complaint that the deaths of their decedents were caused or contributed to by the release of PCBs into the environment from defendants' facilities.

117. The limitations of liability set forth in Article 16 of the New York Civil Practice Law and Rules ("CPLR") do not apply to this action because of exemptions provided in CPLR § 1602(5), (7) and (9).

COUNT I

NEGLIGENCE (GROSS NEGLIGENCE)

118. Plaintiffs incorporate by reference paragraphs 1 through 117 as if fully restated herein.

119. Defendants negligently disposed of PCBs into the environment.

120. Defendants failed to properly supervise the disposal of PCBs at and near their respective facilities.

121. Defendants owed Plaintiffs a duty to use due care in their disposal of PCBs and defendants breached that duty by their acts and omissions.

122. As a direct and proximate result of defendants' negligence, Plaintiffs have been injured, and such injury was foreseeable.

123. Defendants knew or should have known, or consciously disregarded the hazards of PCBs, the hazards associated with improper disposal of PCBs, and the effect of such improper disposal of PCBs on Plaintiffs.

124. Defendants consciously and deliberately released PCBs into the environment by improperly disposing of them.

125. Defendants consciously and recklessly failed to monitor PCBs disposed of at their respective facilities.

126. Defendants consciously and deliberately allowed PCBs to be released from their respective facilities with full understanding of the dangers and consequences thereof to Plaintiffs.

127. Upon information and belief, defendants concealed the dangers posed by their improper disposal of PCBs and the release of those PCBs into the environment from the residents of Akwesasne, including Plaintiffs. With their superior knowledge, defendants had a duty of disclosure which they violated.

128. The aforementioned conduct constitutes gross negligence, recklessness and/or wantonness which has been and continues to be a direct and proximate cause and/or contributing cause of the damages and injuries sustained by Plaintiffs.

129. The acts of defendants have been intentional, willful, wanton, illegal, and done with conscious and deliberate disregard for the life, safety, and rights of Plaintiffs and, as a result of these acts of defendants, Plaintiffs are entitled to punitive damages.

COUNT II

STRICT LIABILITY

130. Plaintiffs incorporate herein by reference paragraphs 1 through 129, as if fully restated herein.

131. Defendants' disposal of PCBs constitutes an abnormally dangerous, ultrahazardous and inherently or intrinsically dangerous activity for which they are strictly liable to Plaintiffs.

132. Said conduct is a direct and proximate cause of injuries to the Plaintiffs.

COUNT III

INTENTIONAL INFLICTION OF EMOTIONAL DISTRESS (OUTRAGE)

133. Plaintiffs incorporate herein by reference paragraphs 1 through 132, as if fully restated herein.

134. Defendants have intentionally inflicted emotional distress on each Plaintiff by knowingly and willfully disposing of PCBs into the environment without advising the Plaintiffs of the serious dangers imposed thereby.

135. Defendants either intended to inflict emotional distress, or, in the alternative, knew or should have known that emotional distress was likely to result from their conduct.

136. Said conduct on the part of the defendants, which reaches beyond all bounds of human decency and is utterly intolerable in a civilized society, has caused extreme emotional distress and mental anguish on the part of each Plaintiff and is a direct and proximate cause of injuries to each Plaintiff.

COUNT IV

NEW YORK STATE NAVIGATION LAW

137. Plaintiffs incorporate herein by reference paragraphs 1 through 136, as if fully restated herein.

138. Defendants are each persons who have discharged petroleum within the meaning of New York State Navigation Law §§ 172 (8), 172(14) and 172(15).

139. The petroleum discharged by defendants was contaminated with PCBs.

140. Defendants are strictly liable, pursuant to Navigation Law § 181(1), for all direct and indirect damages sustained by Plaintiffs as a result of defendants' discharge of PCB-contaminated petroleum, including the damages complained of herein.

COUNT V

WRONGFUL DEATH

141. Plaintiffs incorporate herein by reference paragraphs 1 through 140 as if fully restated herein.

142. As a direct and proximate result of their negligence and grossly negligent, wanton reckless, malicious and/or intentional conduct, said defendants caused certain deceased individuals severe bodily harm, including physical pain and severe mental anguish and/or emotional distress, and death.

143. All such acts and/or omissions of defendants' agents, servants and/or employees were performed within the line and scope of their duties for defendants.

COUNT VI

MEDICAL TESTING, MONITORING, AND TREATMENT

144. Plaintiffs incorporate by reference paragraphs 1 through 143 as if fully restated herein.

145. Plaintiffs who have been exposed to PCBs disposed of by Defendants and who have clinically demonstrable PCBs in their blood, have suffered a present personal injury in the form of cellular and subscellular changes, regardless of any physical manifestation of illness.

146. As a result of the injuries sustained, Plaintiffs require medical monitoring, testing and treatment.

147. Plaintiffs also assert that they are entitled to recover the costs of past and future medical monitoring, testing, and treatment as a separate claim for relief or, alternatively, as additional relief under each of the other claims for relief above.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs demand relief against defendants as follows:

A. Compensatory damages in an amount to be determined after trial;

B. Establishment of a trust fund by defendants to fund Plaintiffs' future medical monitoring, testing, and treatment costs;

C. Punitive damages in an amount to be determined after trial; and

D. Such other and further relief as the Court deems just and proper.

JURY TRIAL DEMAND

Plaintiffs demand a jury trial on all issues so triable.

Dated: Albany, New York
November 28, 2005

DREYER BOYAJIAN LLP
Attorneys for Plaintiffs
75 Columbia Street
Albany, NY 12210
(518) 463-7784

By: _____
William J. Dreyer (Bar Roll #101539)

By: _____
Donald W. Boyajian (Bar Roll # 101196)

By: _____
Christopher A. Amato (Bar Roll # 510258)

J:\DWB\AKWESASNE MOHAWKS\PLEADINGS\MOHAWK PCB COMPLAINT updated 11-29-05.wpd

Unsealed pursuant to the [illegible] Order

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

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MARGERET GEORGE, et. al.,

Plaintiffs,

vs.

GENERAL MOTORS CORPORATION and ALCOA INC.

Defendants.

----------X

NOTICE OF MOTION

Case No. 05-CV-1482
(DNH/GHL)

PLEASE TAKE NOTICE, that upon the annexed Declaration of Donald W. Boyajian, Esq., and the exhibits annexed thereto, and upon all prior pleadings and proceedings herein, Plaintiffs will move this Court before the Honorable George H. Lowe, at the United States Courthouse, James Hanley Federal Building, 100 S. Clinton Street, Syracuse, New York, at a date and time to be scheduled by the Court, for an Order authorizing and approving the George Qualified Settlement Fund to:

(1) distribute all Settlement Funds to Dreyer Boyajian LLP pursuant to the terms of the May 9, 2008 Settlement Agreement. See Settlement Agreement, ¶ III.D.1.

(2) issue a check in the amount of $6,500.00 payable to K.D. Meyers & Associates, PSC for administration of said Qualified Settlement Fund;

(3) hire a Certified Public Accountant to prepare and file the final tax return for the George Qualified Settlement Fund in 2008 and paid said Certified Accountant from Said Fund;

(4) pay the final taxes applicable to the George Qualified Settlement Fund from said Fund;

(5) distribute any funds remaining in the George Qualified Settlement Fund to the Akwesasne Health Care Foundation, Inc.;

(6) file a final accounting with the Court officially closing the George Qualified Settlement Fund; and

(7) relieving the George Qualified Settlement Fund of any and all responsibilities associated with said fund upon the making of the payments referenced herein.

Dated: November 14, 2008
Albany, New York

DREYER BOYAJIAN, LLP

Donald W. Boyajian, Esq.
(Bar Roll # 101196)
Attorneys for Plaintiffs
75 Columbia Street
Albany, New York 12210
(518) 463-7784

TO: **MARK S. LILLIE, ESQ.**
KIRKLAND & ELLIS LLP
Attorneys for Defendant GM
200 East Randolph Drive
Chicago, IL 60601

ARTHUR H. THORN, ESQ.
THORN GERSHON TYMANN AND BONANNI, LLP
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RENE P. TATRO, ESQ.
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333 S. Figeuroa Street
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THOMAS E. REIDY, ESQ.
WARD NORRIS HELLER & REIDY LLP
Attorneys for Defendant Alcoa
300 State Street
Rochester, NY 14614

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

----------X

MARGERET GEORGE, et. al.,

Plaintiffs,

vs.

GENERAL MOTORS CORPORATION and ALCOA INC.

Defendants.

----------X

ATTORNEY DECLARATION IN SUPPORT OF MOTION

Case No. 05-CV-1482 (DNH/GHL)

DONALD W. BOYAJIAN, ESQ., hereby declares the following to be true and correct under penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I am an attorney with Dreyer Boyajian LLP, counsel for Plaintiffs in the above referenced matter.

2. This Declaration is filed in support of Plaintiffs' motion for an Order authorizing and approving the George Qualified Settlement Fund to:

(1) distribute all Settlement Funds to Dreyer Boyajian LLP pursuant to the terms of the May 9, 2008 Settlement Agreement. See Settlement Agreement, ¶ III.D.1.

(2) issue a check in the amount of $6,500.00 payable to K.D. Meyers & Associates, PSC for administration of said Qualified Settlement Fund;

(3) hire a Certified Public Accountant to prepare and file the final tax return for the George Qualified Settlement Fund in 2008 and pay said Certified Accountant from said Fund;;

(4) pay the final taxes applicable to the George Qualified Settlement Fund from said Fund;

(5) distribute any funds remaining in the George Qualified Settlement Fund to the Akwesasne Health Care Foundation, Inc.

(6) file a final accounting with the Court officially closing the George Qualified Settlement Fund; and

(7) relieving the George Qualified Settlement Fund of any and all responsibilities associated with said fund upon the making of the payments referenced herein.

3. By Order dated July 2, 2008, this Court approved the creation of the George Qualified Settlement Fund. (Document No. 201), and ordered that all motion papers filed in connection with the administration of the fund be filed and remain under seal.

4. Pursuant to Paragraph III.D.1 of the Settlement Agreement, defendants have authorized the Fund Administrator of the George Qualified Settlement Fund to release the Settlement Funds to Dreyer Boyajian, LLP. (Ex. A, Letter dated November 10, 2008); (Ex. B, Settlement Agreement dated May 9, 2008 [exhibits omitted]).

5. Wherefore, plaintiffs respectfully request that the court Order the relief requested herein, approving the disbursement of all Settlement Funds to Dreyer Boyajian LLP, payment of the Fund Administrators' fees for administration of the fund, hiring of a CPA and filing of the fund final tax returns, distribution of any remaining funds into the Akwesasne Health Care Foundation, Inc. (the non-for profit entity created

pursuant to Paragraph III.B of the Settlement Agreement), and the filing of a final accounting with the court official closing the George Qualified Settlement Fund.

Dated: November 14, 2008
Albany, New York

DONALD W. BOYAJIAN, ESQ.

EXHIBIT A

DREYER BOYAJIAN LLP
ATTORNEYS AND COUNSELLORS AT LAW
75 COLUMBIA STREET
ALBANY, NY 12210
TELEPHONE (518) 463-7784
FACSIMILE (518) 463-4039
http://www.dreyerboyajian.com

WILLIAM J. DREYER
DONALD W. BOYAJIAN
BRIAN W. DEVANE
JOHN B. CASEY
CRAIG M. CELST
JAMES R. PELUSO
APRIL M. WILSON
AARON E. CONNOR

CHRISTOPHER M. SCARINCE
(of counsel)

November 10, 2008

Karen D. Meyers
KD Meyers & Associates, Ltd.
2651 Observatory Avenue
Cincinnati, Ohio 45208

Re: George Qualified Settlement Fund
George v. GM & Aloca, 05-CV-1482 (N.D.N.Y.)

Dear Ms. Meyers:

Pursuant to the Paragraph III.D.1 of the Settlement Agreement in the above matter, you are hereby authorized to release the Settlement Funds together with any accrued interest to Dreyer Boyajian LLP.

Very truly yours,

Dreyer Boyajian LLP

Donald W. Boyajian, Esq.
Attorneys for Plaintiffs
75 Columbia Street
Albany, NY 12210
(518) 463-7784

Kirkland & Ellis, LLP

Mark S. Lillie, Esq.
Attorneys for Defendant GM Corporation
200 East Randolph Drive
Chicago, IL 60601

Tatro, Tekosky & Sadwick LLP

René P. Tatro /DBS

Rene Tatro, Esq.
Attorneys for Defendant ALCOA Inc.
333 South Grand Avenue, Suite 4270
Los Angeles, CA 90071

EXHIBIT B

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

SETTLEMENT AGREEMENT

This SETTLEMENT AGREEMENT is entered into by and between the Named Plaintiffs, as defined below, and Defendants General Motors Corporation and Alcoa Inc.

RECITALS

WHEREAS, the *George* Litigation commenced on or about November 29, 2005, asserting various common law and statutory claims for relief against Defendants;

WHEREAS, the *Thompson* Litigation commenced on or about August 1, 1979, asserting various common law claims against GM;

WHEREAS, Defendants in each case dispute the claims asserted against them;

WHEREAS, the Parties have engaged in extensive pre-trial discovery;

WHEREAS, counsel for the Parties have engaged in extensive, arm's-length negotiations with regard to the possible settlement of the Litigation; and

WHEREAS, the Parties desire to promptly and fully resolve and settle with finality all of the Claims against Defendants;

NOW, THEREFORE, the Parties, in consideration of the promises, covenants and agreements herein described, and for other good and valuable consideration, acknowledged by each of them to be satisfactory and adequate, do hereby mutually agree as follows:

I. DEFINITIONS.

For the purposes of this Agreement and all exhibits hereto:

1. "Agreement" shall mean this Settlement Agreement and all attached exhibits.

2. "Alcoa" shall mean Alcoa Inc., its past, present or future parents, divisions, predecessors, affiliates, subordinates, subsidiaries, and controlling persons, and all of its and/or

their past, present or future shareholders, directors, officers, attorneys, representatives, employees, insurers, servants, heirs, administrators, successors, assigns, and agents.

3. "Allocation" shall mean the sum of money found to be due from the Settlement Escrow Account to each Named Plaintiff, Dismissed Plaintiff, and Potential Plaintiff.

4. "Akwesasne" shall mean the Mohawk Indian reservation located on the St. Lawrence River that occupies approximately 28,000 acres in the State of New York and in the Provinces of Ontario and Quebec in Canada.

5. "Akwesasne Health Care Trust" shall mean the not-for-profit corporation, foundation, trust, or other legal entity created pursuant to Section III.B of this Agreement.

6. "Claim" or "Claims" shall mean any and all claims, demands, suits, actions, rights of action, interventions, liabilities, liens, and causes of action, at law, equity, admiralty or otherwise, whether known or unknown, filed or unfiled, asserted or as yet unasserted.

7. "Defendants" shall mean collectively Alcoa and GM.

8. "Dismissed Plaintiff" or "Dismissed Plaintiffs" shall mean the individuals listed in the caption of either the original complaint (dated November 28, 2005) or the first Amended Complaint (dated April 10, 2007), but who are not listed in the Second Amended Class Action Complaint (dated October 17, 2007), in the *George* Litigation.

9. "Dreyer Boyajian" shall mean the law firm Dreyer Boyajian LLP that represents Plaintiffs.

10. "Final Settlement Date" means the date on which all of the following have occurred: (a) the Settlement Agreement has been fully executed by the Parties; and (b) Defendants have notified Dreyer Boyajian in writing, at the end of Verification Period, that they accept the Releases.

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

11. The "Litigation" shall mean the lawsuit captioned *George et al. v. GM & Alcoa* that is currently pending in the United States District Court for the Northern District of New York (Case No. 05-CV-1482) and the lawsuit captioned *Harry Thompson v. General Motors Corporation* that was filed in the State of New York, Supreme Court, County of Saint Lawrence on or about August 1, 1979.

12. "GM" shall mean General Motors Corporation, its past, present or future parents, divisions, predecessors, affiliates, subordinates, subsidiaries, and controlling persons, and all of its and/or their past, present or future shareholders, directors, officers, attorneys, representatives, employees, insurers, servants, heirs, administrators, successors, assigns, and agents.

13. "Named Plaintiff" or "Named Plaintiffs" shall mean the individuals listed in the caption of the Second Amended Class Action Complaint (dated October 17, 2007) in the *George* Litigation and the individual listed in the caption of the Complaint in the *Thompson* Litigation.

14. "Parties" shall refer collectively to Named Plaintiffs and Defendants.

15. "Party" shall refer to any Named Plaintiff or Defendant, as the context requires.

16. "Person" or "Persons" shall mean any natural person or individual, government, or legal entity, including, without limitation, corporations, partnerships and associations, and their successors or assigns.

17. "Plaintiff" or "Plaintiffs" shall refer collectively to Named Plaintiffs, Dismissed Plaintiffs, and Potential Plaintiffs.

18. "Potential Plaintiff" or "Potential Plaintiffs" refers to those individuals who live, or have lived, within the geographical boundaries of Akwesasne, who claim they were exposed to releases by GM and/or Alcoa (including releases of PCBs), and who claim to have had an injury, or been placed at an increased risk of injury, as a result of such exposure.

19. "Preferred Services Plan" shall mean the plan administered as an ancillary component of the Akwesasne Health Care Trust.

20. "Release" or "Releases" shall refer to the Release attached as Exhibit A.

21. "Released Claim" or "Released Claims" shall be those claims released in the attached Release.

22. "Release Period" shall refer to the ninety (90) day period following the execution of the Settlement Agreement by all Parties. Dreyer Boyajian may end the Release Period before the expiration of the ninety (90) day time period by notifying Defendants in writing. Dreyer Boyajian may also extend the Release Period for an additional thirty (30) days by notifying Defendants in writing before the initial ninety (90) day period expires. Defendants must approve any extension of the Release Period beyond one hundred and twenty (120) days from the execution of the Settlement Agreement.

23. "Settlement Escrow Account" shall mean the interest bearing bank account created pursuant to Section III.A.1 of this Agreement constituting an approved Qualified Settlement Fund within the meaning of Section 468B of the Internal Revenue Code of 1986 as amended and all rulings thereunder.

24. "Settlement Funds" shall mean those funds paid into the Settlement Escrow Account by Defendants pursuant to Section III.A.2 of this Agreement.

25. "Verification Period" shall refer to the thirty (30) day period following the delivery of the Releases to Defendants. Defendants may extend the Verification Period for an additional fifteen (15) days by notifying Dreyer Boyajian in writing.

II. REASONS FOR SETTLEMENT.

1. In entering into this Agreement, each Party has taken into account the uncertainties, delays, expenses and exigencies of the litigation process, including the extensive depositions, document production, and other discovery taken to date in the Litigation. The Parties have agreed to enter into this Settlement Agreement in order to resolve all matters and disputes between them including those alleged in the Litigation.

2. The Parties are entering into this Agreement in recognition of (a) the existence of complex and contested issues of law and fact, (b) the risks inherent in litigation, (c) the likelihood that future proceedings will be protracted and expensive if the proceeding is not settled by voluntary agreement, (d) numerous uncertainties associated with potential recovery upon further litigation, and (e) the determination by the Parties that under the circumstances present the settlement is fair, reasonable, adequate, and in their best interests.

3. The Parties have evaluated and considered the nature and extent of the claims and defenses asserted from a settlement perspective. Each Party affirms that they have consulted with their counsel of choice before voluntarily deciding to agree to the terms set forth herein. Substantial time and effort has been expended by the Parties and their counsel in negotiating this Agreement and the settlement contemplated thereby.

4. Defendants have each denied, and continue to deny, any liability, wrongdoing or responsibility for the claims asserted in the Litigation and believe that the claims are without merit and that such claims are barred in whole or in part. Despite their denials of liability and

injury, Defendants enter into this Agreement to terminate all controversy and to put to rest finally all Released Claims against Defendants, and to avoid further litigation.

III. TERMS OF SETTLEMENT.

A. Funds into Settlement Escrow Account.

1. Within fourteen (14) days of the execution of this Agreement by all Parties, Dreyer Boyajian shall establish the Settlement Escrow Account. Dreyer Boyajian shall provide to Defendants (a) written notification of the date of establishment of the Settlement Escrow Account, (b) written notification of the following information regarding the Escrow Agent and the Settlement Escrow Account: bank name, bank address, ABA number, account number, account name, and taxpayer identification number, and (c) any additional information needed to deposit the Settlement Funds into the Settlement Escrow Account. No funds shall be released from the Settlement Escrow Account to Dreyer Boyajian, Plaintiffs, or anyone else, prior to the Final Settlement Date, unless agreed to in writing by Defendants. Dreyer Boyajian shall direct the Escrow Agent to only make distributions from the Escrow Account in strict accordance with the Settlement Agreement. No other distributions shall be authorized by Dreyer Boyajian.

2. Within twenty-one (21) days of the establishment of the Settlement Escrow Account, Defendants shall deposit a total of five million four hundred thousand dollars ($5,400,000.00) into the Settlement Escrow Account in consideration of, and expressly in exchange for, all of the promises and agreements set forth in the Settlement Agreement. Under no circumstances shall Defendants be required to deposit more than five million four hundred thousand dollars ($5,400,000.00) into the Settlement Escrow Account. Upon such deposit, the payment obligations of Defendants under this Settlement Agreement shall be satisfied and fulfilled.

3. On the Final Settlement Date, Defendants' interest in the funds deposited into the Settlement Escrow Account shall cease and Defendants shall have no further obligation to Plaintiffs except as set forth in this Agreement.

B. Establishment of Akwesasne Health Care Trust.

1. Within sixty (60) days of the execution of this Agreement by all Parties, Dreyer Boyajian and Named Plaintiffs, in coordination with the Mohawk governing authorities charged with the Administration of health care at Akwesasne, shall create a not-for-profit corporation, foundation, trust, or other legal entity called the Akwesasne Health Care Trust. Defendants have the right to approve of the form of the legal entity selected by Dreyer Boyajian and Named Plaintiffs.

2. The Akwesasne Health Care Trust shall assist the residents of Akwesasne in supplementing and otherwise defraying the costs of health care services for the medical diagnosis of, treatment of, care of and/or dissemination of health/medical information to the residents of Akwesasne. The Akwesasne Health Care Trust shall also administer the Preferred Services Plan as an ancillary component of the Akwesasne Health Care Trust. The Preferred Services Plan, the details of which shall be prepared by plaintiffs' counsel in consultation with the Akwesasne Health Care Trust, shall be a separate fund used to offset and/or defray medical and/or health related expenses incurred by Potential Plaintiffs for services not otherwise covered by existing plans or policies. In no event shall the Preferred Services Plan conflict with or supplant any other source of payment or reimbursement for medical/health related expense. Defendants shall have the right to approve the Preferred Services Plan upon its preparation. The Akwesasne Health Care Trust shall work with the Mohawk governing authorities who administer health care at Akwesasne to achieve these results.

3. The Parties expressly acknowledge that it is the intent of this Agreement to supplement—and not replace—health care services already provided to the residents of Akwesasne by private and/or governmental authorities. The Akwesasne Health Care Trust will, therefore, provide services in a manner that preserves the continuity of any pre-existing health care benefits whether provided under State, Federal, Canadian or Tribal law.

4. Defendants may participate in the oversight and administration of the Akwesasne Health Care Trust. If there is a board or similar body that oversees and administers the Akwesasne Health Care Trust, each Defendant shall, if they so request, be given one seat on the board, but under no circumstances shall Defendants comprise the majority of the board. If one Defendant opts not to take a seat on the board, the other Defendant may occupy that seat as well. If there is no board or similar body, it is the intent of the Parties to allow Defendants to participate on equal footing with any other participants in whatever body oversees and administers the Akwesasne Health Care Trust, but Defendants shall not control the Akwesasne Health Care Trust.

5. The creation of the Akwesasne Health Care Trust shall not create any beneficiary relationship that extends any obligation to be borne by either Alcoa or GM.

C. Releases of Liability.

1. In exchange for the consideration set forth herein, Plaintiffs shall execute the Release attached hereto as Exhibit A.

2. During the Release Period, Dreyer Boyajian shall use its best efforts to secure signed and notarized Releases from Named Plaintiffs, Dismissed Plaintiffs, and seven hundred (700) Potential Plaintiffs. To the extent necessary, Dreyer Boyajian shall also obtain approval

from the Court of appropriate jurisdiction for the settlement of Released Claims of any Plaintiff who is deceased or a minor during the Release Period.

3. At the conclusion of the Release Period, Dreyer Boyajian shall deliver to Defendants notarized copies of the Releases signed by Plaintiffs. Defendants will hold the Releases in escrow until the Final Settlement Date.

4. During the Verification Period, Defendants shall have an opportunity to inspect the Releases. The Parties shall work together to resolve any of Defendants' concerns about the validity of the Releases. If Defendants determine during the Verification Period that there is an insufficient number of Releases from Named Plaintiffs, Dismissed Plaintiffs, and seven hundred (700) Potential Plaintiffs, Defendants shall have, at their sole and absolute discretion, the option of either of the following:

a. obtaining a refund of the five million four hundred thousand dollars ($5,400,000.00) deposited into the Settlement Escrow Account and terminating the Settlement Agreement;

b. extending the Release Period so that Dreyer Boyajian may attempt to secure additional Releases; or

c. authorizing a pro rata distribution of the funds in the Settlement Escrow Account upon the mutual consent of plaintiffs.

5. On or before the conclusion of the Verification Period, Defendants shall notify Dreyer Boyajian in writing whether defendants object to the number, content and execution of the Releases and whether Defendants are exercising one of the options described above.

D. Settlement Funds and Releases Distributed.

1. Within three (3) business days of the Final Settlement Date, Defendants shall authorize the Escrow Agent to release the Settlement Funds to Dreyer Boyajian. After the release of the Settlement Funds, Dreyer Boyajian shall become the sole trustee of the Settlement Escrow Account. Dreyer Boyajian shall disperse the Settlement Funds as follows:

a. Dreyer Boyajian may use up to three hundred thousand dollars ($300,000.00) as consideration for Named Plaintiffs and Dismissed Plaintiffs. However, no Named Plaintiff or Dismissed Plaintiff may receive more than seven-thousand five hundred dollars ($7500.00). Dreyer Boyajian shall be solely responsible for obtaining the consent of Plaintiffs and, to the extent required, the court, for the Allocation to each Named Plaintiff and Dismissed Plaintiff from the Settlement Escrow Account. Plaintiffs expressly acknowledge that Defendants have no responsibility or liability associated with the Allocation. Within 10 days of any Allocation, Dreyer Boyajian shall certify in writing that the Allocation has, and the payments have, been made in accordance with the terms of this Agreement. Defendants shall have the right, upon reasonable demand, to audit the payments in order to ensure compliance with the terms set forth herein.

b. Dreyer Boyajian shall use one million dollars ($1,000,000.00) as consideration for Potential Plaintiffs. No more than five-hundred thousand dollars ($500,000.00) may be used as Allocations to Potential Plaintiffs. Each Potential Plaintiff shall receive an Allocation of at least

two-hundred and fifty dollars ($250.00), but not more than one-thousand dollars ($1,000.00). Dreyer Boyajian shall be solely responsible for obtaining the consent of Plaintiffs and, to the extent required, the court for the Allocation to each Potential Plaintiff. Plaintiffs expressly acknowledge that Defendants have no responsibility or liability associated with the Allocation. Dreyer Boyajian shall also use at least five-hundred thousand dollars ($500,000.00) of the one million dollars ($1,000,000.00) to fund the Preferred Services Plan for the benefit of Potential Plaintiffs. Within ten (10) days of any Allocation, Dreyer Boyajian shall certify in writing that the Allocation has, and the payments have, been made in accordance with the terms of this Agreement. Defendants shall have the right, upon reasonable demand, to audit the payments in order to ensure compliance with the terms set forth herein.

c. Dreyer Boyajian shall deposit two million dollars ($2,000,000.00), plus any interest that has accrued, into the Akwesasne Health Care Trust (in addition to any sums allocated for the Preferred Services Plan from the $1,000,000 paid to the Potential Plaintiffs pursuant to Section III.D.1(b) above).

d. Pursuant to its applicable retainer agreements or as otherwise approved by the court, Dreyer Boyajian may withdraw attorneys' fees and costs.

2. Within three (3) business days of the Final Settlement Date, Dreyer Boyajian shall authorize the Escrow Agent to release the Releases to Defendants.

E. Withdrawal of Class Action Allegations.

1. Within five (5) business days of the Final Settlement Date, Named Plaintiffs shall withdraw the class action allegations from the Litigation by filing the Notice of Withdrawal that is attached as Exhibit B and the Third Amended Complaint that is attached as Exhibit C.

F. Dismissal With Prejudice of All Litigation.

1. After the Court approves the Notice of Withdrawal, attached hereto as Exhibit B, Named Plaintiffs shall have three (3) business days to file the Notice of Voluntary Dismissal with Prejudice, attached as Exhibit D, in the Litigation.

2. Within five (5) business days of the Final Settlement Date, Dreyer Boyajian shall file the Notice of Voluntary Dismissal with Prejudice in the Litigation that is attached as Exhibit D.

IV. COVENANT NOT TO SUE

1. The Named and Dismissed Plaintiffs covenant and agree (a) not to file against Defendants any additional suit based on or arising from any Released Claim, or refile any of the claims brought in the Litigation, and (b) that the foregoing covenants and agreements shall be a complete defense to any such claims against Defendants.

V. LIENHOLDERS

1. Any and all liens, rights of subrogation, or rights of reimbursement, that exist currently or are created in the future by virtue of payments made or benefits provided to Plaintiffs up to the time that funds are distributed under III D. above, in favor of any governmental agency, insurance company, or health care provider, are to be exempted, waived, or satisfied out of the proceeds of this settlement. Plaintiffs shall identify to Defendants in writing each person and/or entity that has such a known claim, lien, right of subrogation, or right to reimbursement arising from any benefits or payments of any kind made to or on behalf of

Plaintiffs, including but not limited to medical care, workers compensation, medical insurance, disability insurance, Medicare, Medicaid, and/or any other form of public health and welfare assistance that would create a claim, lien, right of subrogation, or right to reimbursement. Defendants shall not be liable or responsible to pay any claim, lien, right of subrogation, or right to reimbursement arising from any benefits or payments of any kind made to or on behalf of Plaintiffs, including but not limited to medical care, workers compensation, medical insurance, disability insurance, Medicare, Medicaid, and/or any other form of public health and welfare assistance that would create a claim, lien, right of subrogation, or right to reimbursement, and each Plaintiff and the Akwesasne Health Care Trust shall indemnify Defendants and hold them harmless against all such liens, claims, subrogation claims or rights of reimbursement.

VI. MUTUAL OBLIGATIONS OF ASSISTANCE

1. Dreyer Boyajian, on behalf of Plaintiffs, and Defendants shall have the mutual obligation to assist each other and cooperate in the effectuation of this Agreement in accordance with the terms of this Agreement and all applicable legal requirements. The Parties shall take all steps necessary or appropriate to maintain the integrity and goals of this Agreement in all further proceedings in the Litigation, and to take such action as may be legally proper to assure the jurisdiction of the United States District Court of the Northern District of New York over this Agreement and all subsequent proceedings.

VII. NO KNOWLEDGE OF OTHER LITIGATION

1. The Parties acknowledge that they are not aware of, or have not been notified of, any lawsuit, claim, or legal action, either pending or threatened, or the basis of any such lawsuit, claim or legal action, by or on behalf of any resident of Akwesasne or any other Person arising out of or related to, directly or indirectly, the Litigation. In addition, Dreyer Boyajian

agrees to notify Defendants promptly of any additional lawsuits, claims, or legal actions, of which they receive notice in the future up to the time that funds are distributed under III D. above, which affect the above obligations.

2. In further consideration of the amounts paid, Dreyer Boyajian shall seek permission (through the use of their best efforts) to identify by name all Potential Plaintiffs and, in addition, any Person who has contacted Dreyer Boyajian in any way, shape or form at any time for the purposes of considering involvement in the Litigation or asserting claims against Defendants, to the extent that such Potential Plaintiffs are not already participating in the Agreement.

VIII. CONSENT OF PLAINTIFFS

1. Each Plaintiff executing this Agreement represents and warrants that, prior to his/her execution of the Agreement: (a) Dreyer Boyajian has explained to his/her satisfaction the effect of this Agreement to him/her and he/she is fully informed of the nature of the Released Claims and the obligations undertaken by this Agreement, and (b) Dreyer Boyajian has not made any undisclosed payment or promise to him/her for the direct or indirect purpose of obtaining his/her consent to this Agreement.

IX. DUE DILLIGENCE IN ASCERTAINING REPRESENTATIONS AND WARRANTIES

1. The Parties agree that they shall have a continuing obligation to ensure that these representations and warranties are accurate and shall notify Defendants within a reasonable time after counsel signing this Agreement is made aware of a fact or condition which may cause any of these representations or warranties to be inaccurate.

X. CONFIDENTIALITY

1. The Parties agree that they, and their respective parents, divisions, predecessors, affiliates, subordinates, subsidiaries, controlling persons, and all of its and/or their past, present or future shareholders, directors, officers, attorneys, representatives, employees, insurers, servants, heirs, administrators, successors, assigns, and agents will maintain the confidentiality of the terms of this Agreement and the Release, the preceding negotiations, including the amount paid, and the underlying facts and circumstances, and will not disclose those terms or amount paid except as may be required by law. The Parties may, however, disclose that the matter has been resolved amicably between the Parties.

XI. MISCELLANEOUS PROVISIONS.

A. Qualified Settlement Fund.

1. The Settlement Escrow Account may be established as an approved "Qualified Settlement Fund" within the meaning of Section 468B of the Internal Revenue Code of 1986 and all rulings thereunder.

B. Return of Documents.

1. Within ten (10) days of filing the Stipulation of Dismissal in the *George* Litigation, the Parties agree to return all documents produced in the *George* Litigation (including all copies of such documents) to the person or entity that produced them, except as to medical, school, and other records Defendants obtained from third parties, which Defendants agree to archive in accordance with reasonable procedures intended to maintain the privacy of these records, but which will make them readily available to Defendants in the event any Plaintiff breaches its obligations to Defendants.

C. Liability for Fees.

1. Except as otherwise specifically provided for in this Agreement, no Party shall be liable for any costs or expenses incurred by or on behalf of any other Party in connection with this Agreement and the actions contemplated thereby.

D. Liability for Taxes.

1. Plaintiffs acknowledge that Defendants have no responsibility for any taxes due on funds (a) once deposited into the Settlement Escrow Account, or (b) that Plaintiffs or Dreyer Boyajian receive from the Settlement Escrow Account. Nothing herein shall constitute an admission or representation that any taxes will or will not be due on the Settlement Escrow Account.

E. Headings for Convenience Only.

1. The headings of each section and paragraph of this Agreement are included for convenience only and shall not be deemed to constitute part of this Agreement or to affect its construction.

F. Applicable Law and Venue.

1. The Parties expressly choose New York law to apply to any dispute under the Settlement Agreement or the Release regardless of any particular Party's citizenship, residence, or domicile.

2. The Parties expressly agree that any dispute arising under the Settlement Agreement or the Release must be resolved in the United States District Court for the Northern District of New York. The Parties further agree that the United States District Court for the Northern District of New York shall have continuing jurisdiction for resolution of any such dispute.

G. Authority of Signatories.

1. Each of the signatories to this Agreement warrants he/she is authorized and empowered to execute this Agreement. Each Party represents and warrants that there has been no assignment or transfer of any rights or claims covered by this Agreement or the Releases executed in conjunction herewith.

H. Binding Effect.

1. This Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective parents, divisions, predecessors, affiliates, subordinates, subsidiaries, controlling persons, and all of its and/or their past, present or future shareholders, directors, officers, attorneys, representatives, employees, insurers, servants, heirs, administrators, successors, assigns, and agents.

I. No Party Deemed the Drafter.

1. This Agreement has been negotiated at arm's length, with the participation of counsel for all the Parties. In the event of any dispute arising out of this Agreement, or in any proceeding to enforce any of the terms of this Agreement, none of the Parties shall be deemed to be the drafter of this Agreement or of any particular provision or provisions, and no part of this Agreement shall be construed against a Party on the basis of that Party's identity as the drafter of any part of this Agreement.

J. Entire Agreement.

1. The Parties represent, warrant and agree that no promise or agreement not expressed herein or in the exhibits hereto has been made to them, and that this Agreement, complete with its exhibits, contains the entire agreement between the Parties, and that the Agreement supersedes any and all prior agreements or understandings between the Parties with respect to the matters herein, and that the terms of this Agreement are contractual and not a mere

recital; that in executing this Agreement, no Party is relying on any statement or representation made by the other, nor any agents and attorneys of any Party concerning the subject matter, basis or effect of this Agreement other than as set forth herein; and that in executing this Agreement, the Parties relied solely on their own judgment and knowledge. No prior draft of this Agreement, nor any negotiations or proceedings in pursuance of this Agreement, nor any other parol evidence, shall be offered or received as evidence concerning the interpretation or construction of this Agreement, except as provided by New York law.

K. Amendments.

1. This Agreement shall not be altered, amended or modified except by written instrument executed by all Parties. The Parties reserve the right to grant any reasonable extensions of time that might be necessary or desirable in carrying out any of the provisions of this Agreement, if all Parties so agree.

L. Inadmissibility.

1. The Parties specifically acknowledge, agree and admit that this Agreement and its exhibits, along with all related drafts, motions, pleadings, conversations, negotiations and correspondence, shall be considered a compromise within the meaning of Federal Rules of Evidence article 408, and any equivalent rule of evidence of any state, and shall not constitute, be construed, be offered, or received into evidence as an admission of the validity of any claim or any fact alleged by Plaintiffs in the Litigation or in any other pending or subsequently filed action, or of any wrongdoing, fault, violation of law, or liability of any kind on the part of Defendants or admission by Defendants of any claim or allegation made in the Litigation or in any action, nor as an admission by Plaintiffs of the validity of any fact or defense asserted against them in the Litigation or in any action. However, nothing contained in this paragraph

shall be interpreted to restrict the right of any Party to introduce evidence required for the enforcement or interpretation of this Agreement.

M. Severability.

1. If any provision of the Agreement as applied to any Party or to any circumstances shall be adjudged by a court to be invalid, void or unenforceable, the same shall in no way affect (a) any other provision of the Agreement, (b) the application of such provision in any other circumstances, and (c) the validity or enforceability of the Agreement as a whole, provided, however, that if the term declared void or unenforceable is material to the Party for whom such term provided a benefit or protection, that Party can seek other remedies, including, without limitation, rescission or reformation, based on the term being declared void and unenforceable.

N. Termination.

1. Defendants may terminate this Agreement if any one of the following occurs: (a) there are an insufficient number of Releases from Named Plaintiffs, Dismissed Plaintiffs, and seven hundred (700) Potential Plaintiffs, (b) failure of the Northern District of New York to enter the Withdrawal of Class Allegations in the Litigation, or (c) failure of the appropriate court with jurisdiction over the Litigation to enter an order and/or stipulation as is required to effectuate the dismissal of the Litigation with prejudice. In the event this Agreement is terminated for any of the foregoing reasons:

a. Defendants shall immediately receive a return of all Settlement Funds plus all accrued interest less: (a) the bank service and transaction charges, and (b) taxes, if any, on interest paid by the bank and tax preparation charges, if any; and

b. the Litigation shall for all purposes with respect to the Parties revert to its status as of the day this Agreement was signed.

O. Procedure for Execution.

1. This Settlement Agreement may be executed by exchange of faxed or electronically transmitted (.pdf) executed signature pages, and any signature transmitted by facsimile or .pdf for the purpose of executing this Settlement Agreement shall be deemed an original signature for purposes of this Settlement Agreement. This Settlement Agreement may be executed in two or more counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same instrument.

P. Notice Provision

Any notices or communications pursuant to this Agreement shall be made to the following persons by U.S. Mail and Federal Express:

To GM: c/o Mark S. Lillie
Kirkland & Ellis LLP
200 East Randolph Drive
Chicago, Ill. 60601

And

Arthur H. Thorn
Thorn Gershon Tymann and Bonanni, LLP
5 Wembley Ct., New Karner Rd.
P.O. Box 15054
Albany, new York 12212

To Alcoa: c/o Rene P. Tatro
Tatro Tekosky Sadwick LLP
335 South Grand Ave.
Los Angeles, Ca. 90071

And

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

Thomas E. Reidy
Ward Norris Heller & Reidy LLP
300 State Street
Rochester, new York 14614

To Plaintiffs' Counsel and/or Plaintiffs:

Donald Boyajian
Dreyer Boyajian LLP
75 Columbia Street'
Albany, New York 12210

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

DREYER BOYAJIAN LLP

By: _____ date: 4/24/08

By: _____ date: 4/28/08

NAMED PLAINTIFFS

By: _____ date: 4/24/08
Margaret George

By: _____ date: 4/24/08
Rachel George, individually and as natural guardian of Mark George

By: _____ date: 4/24/08
Autumn A. Leaf

By: _____ date: 4/24/08
Ann Y. Leaf

By: _____ date: 4/24/08
Vicky Benedict

By: _____ date: 4/24/08
Helen Benedict

By: _____ date: 4/24/08
Dawn A. Bero

By: _____ date: 4/24/08
Shawna A. Bero

By: _____ date: 4/25/08
Julius J. Cook

By: _____ date: 4/24/08
Betty A. David

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

By: Elijah R. Cole date: 4/24/08
Elijah Cole

By: date: 4/24/08
Bianca J. Jacobs

By: date: 4/24/08
Theresa Jacobs, individually and as natural guardian of Feryn King

By: date: 4/24/08
Theresa Jacobs, individually and as natural guardian of Gordon King

By: date: 4/24/08
Theresa Jacobs, individually and as natural guardian of Mary Jacobs

By: Kahawanion David date: 4/25/08
Kahawanion David

By: Kanietahawi Sharrow date: 4/24/08
Kanietahawi Sharrow, individually and as natural guardian of Kaiennahawi Sharrow

By: Dawn M. LaFrance date: 4/24/08
Dawn LaFrance, individually and as natural guardian of Brettani Heroy

By: Tina L. Mitchell date: 4/24/08
Tina Mitchell, individually and as natural guardian of Chad Garrow

By: Margaret L. Mobbs-Square date: 4/24/08
Margaret Square, individually and as natural guardian of Alan Square and Andrew Square

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

By:_____ date:_____
Anna Thompson

By: Dulsie Thompson date: 4/24/08
Dulsie Thompson

By:_____ date: 4/24/08
Eric Thompson

By: Harry Thompson date: 4/24/08
Harry Thompson as Plaintiff in the *George* Litigation

By: Harry Thompson date: 4/24/08
Harry Thompson as Plaintiff in the *Thompson* Litigation

By: Loran L Thompson date: 4/24/08
Loran Thompson

By:_____ date: 4/24/08
Oren L. Thompson

By:_____ date: 4/28/08
Tina Thompson, individually and as natural guardian of Alexis Arquette

By: Elizabeth Benedict date: April 24, 2008
Elizabeth Benedict, Administratrix of the Estate of Edwin Bruce Benedict

GENERAL MOTORS CORPORATION

By: William J. McFarland date: 5-1-08

ALCOA INC.

By:_____ date:_____

FOR SETTLEMENT PURPOSES ONLY
PURSUANT TO FEDERAL RULE OF EVIDENCE 408
PRIVILEGED AND CONFIDENTIAL

By: _____ date: 4-28-08
Anna Thompson

By: Dulsie Thompson date: 4/24/08
Dulsie Thompson

By: _____ date: 4/24/08
Eric Thompson

By: Harry Thompson date: 4/24/08
Harry Thompson as Plaintiff in the *George* Litigation

By: Harry Thompson date: 4/24/08
Harry Thompson as Plaintiff in the *Thompson* Litigation

By: _____ date: 4/24/08
Loran Thompson

By: _____ date: 4/24/08
Oren L. Thompson

By: _____ date: 4/24/08
Tina Thompson, individually and as natural guardian of Alexis Arquette

By: Elizabeth Benedict date: April 29, 2008
Elizabeth Benedict, Administratrix of the Estate of Edwin Bruce Benedict

GENERAL MOTORS CORPORATION

By: _____ date: _____

ALCOA INC.

By: JR Luckett date: 5/9/08
Executive Vice President

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

----------X

MARGARET GEORGE, et al.,

Plaintiffs,

-against-

CASE No. 05-CV-1482 (DNH/GHL)

GENERAL MOTORS CORPORATION and ALCOA, INC.,

Defendants.

----------X

CERTIFICATE OF SERVICE

I hereby certify that on November 14, 2008, I forwarded a copy of Notice of Motion, Attorney Declaration and Proposed Order, via first class mail, in a post-paid, properly addressed wrapper, in an official depository under the exclusive care and custody of the United States Postal Service in the City of Albany, New York, to the following:

Rene P. Tatro, Esq.
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Attorneys for GM Corporation
P.O. Box 15054
Albany, New York 12212

Mark S. Lillie, Esq.
Kirkland & Ellis LLP
Attorneys for GM Corporation
200 East Randolph Drive
Chicago, Ill 60601

Colleen B. O'Connell
COLLEEN B. O'CONNELL

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

MARGARET GEORGE, *et al.*,

Plaintiffs,

v.

7:05-CV-1482
(DNH/GHL)

GENERAL MOTORS CORPORATION and
ALCOA, INC.,

Defendants.

APPEARANCES: OF COUNSEL:

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Albany, New York 12210

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DONALD W. BOYAJIAN, ESQ.

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Los Angeles, California 90017

RENÉ P. TATRO, ESQ.

WARD NORRIS HELLER & REIDY
Counsel for Defendant Alcoa, Inc.
300 State Street
Rochester, New York 14614

THOMAS E. REIDY, ESQ.

GEORGE H. LOWE, United States Magistrate Judge

ORDER

Now pending before the Court is a sealed motion filed by Plaintiffs. (Dkt. Nos. 204-205.) The motion was referred to me by the Honorable David N. Hurd, United States District Judge, to issue an order pursuant to 28 U.S.C. § 636(b)(1)(A). The motion is not opposed by Defendants.

Having reviewed the motion and supporting affidavits, it is hereby

ORDERED, that the motion is **GRANTED**. The Court hereby approves (1) the settlement and compromise of the claims discussed in the moving papers; (2) the filing of a notice of withdrawal of class action complaint; (3) the filing of a Third Amended Complaint; and (4) the filing of a Stipulation of Discontinuance and Order of Dismissal.

Dated: November 6, 2008
Syracuse, New York

George H. Lowe
United States Magistrate Judge

EXHIBIT

9

PCB Policies - Item 2

ALCOA INDUSTRIAL HYGIENE
PCB POLICY STATEMENTS

FROM JOSEPH DANIANO

TO

PITTSBURGH OFFICE

1979 October 18

INDUSTRIAL HYGIENE TECHNICAL BULLETIN NO. 79-2

RE: POLYCHLORINATED BIPHENYLS (PCBs) IN ELECTRICAL, HYDRAULIC, AND HEAT EXCHANGE EQUIPMENT

Summary

Employees working with certain hydraulic, heat exchange, capacitor and transformer fluids have potential exposure to PCBs contained in the fluids. Although PCBs are readily absorbed through the skin, we do not consider an incidental exposure to be harmful. There has been no evidence of carcinogenic effects from long-term human exposure. However, high-concentration animal feeding studies have indicated excess liver cancers in test animals. Prolonged and repeated skin contact with fluids containing PCBs can lead to dermatitis and possible liver damage. Management should implement the worker hygiene recommendations in this Bulletin to minimize skin contact. Animal studies demonstrate that PCBs can cause adverse reproductive effects in women and PCBs are highly fetotoxic; women of child-bearing age should not be assigned to work involving potential exposures to PCBs.

PCB Sources

Polychlorinated biphenyls were originally developed by Monsanto under the trade name Aroclor. Monsanto discontinued production of PCBs in 1977, prior to their being banned by EPA in 1979. PCBs may be present in our plants in the following equipment:

1. Capacitors

   Electrical capacitors manufactured prior to 1979.

2. Transformers

   a. Transformers filled with a fire-resistant dielectric commonly termed "Askarel", contain a high percentage of PCBs. Trade names for this dielectric include: Inerteen, Pyranol, No Flamol, Chlorextol and Elemex.

   b. Transformers filled with petroleum oil may have been, in some instances, inadvertently contaminated with PCBs.

ALCOA

3. Hydraulic Systems

Hydraulic systems using the phosphate ester types of fire-resistant fluids (Alcoa ML 916, 924, 925 and 928), installed prior to 1975 may have contained up to 20-25% PCBs. Although PCBs have not been intentionally added to these fluids since 1975, there may be PCB residuals in a small percentage of the phosphate ester systems in service today. Also, phosphate ester hydraulic systems converted to petroleum based fluids prior to 1970 may be contaminated with PCBs. Recent inspections of hydraulic systems have shown that concentrations are generally less than 500 ppm, however, some have been found to contain percentages of PCBs.

4. "Hot-Oil" Systems

Heat exchanger fluids other than petroleum oil may contain PCBs, e.g., Monsanto's Therminols FR 1, 2, and 3 contain nearly 100% PCBs, and Dowtherm G, contains up to 0.1% PCBs.

Employee Education

Employees potentially exposed to PCBs should be advised of the potential health affects and the manner in which exposures can be minimized, as reviewed in these paragraphs.

Health Effects

1. Skin

Prolonged and repeated skin contact with fluids containing high concentrations of PCBs can lead to a dermatitis termed "chloracne" and/or liver injury. Liver injury has been observed in animal and human studies. Although polychlorinated biphenyls are readily absorbed through the skin, we do not consider an incidental exposure to be harmful. On the other hand, because PCBs are not easily metabolized and excreted, prolonged and repeated skin contact could result in sufficient internal accumulation to cause liver injury.

2. Cancer

Presently, PCBs have not been demonstrated to constitute a cancer risk in man. In several animal experiments, increased incidences of liver cancer have been found in rats fed high concentrations of PCBs. Other animal studies have indicated no carcinogenic effects. A National Cancer Institute animal study performed at lower dosages showed no statistically significant increase in tumors. Furthermore, Monsanto, the sole manufacturer of PCBs, could find no relationship between cancer and PCB exposure among its more than 300 current and former employees who had been engaged in PCB production since 1936.

3. If a fluid containing PCBs is spilled or splashed on a worker, visibly contaminated or wet clothing should be removed and the skin washed thoroughly with soap and water. Anyone whose clothing is grossly contaminated should be required to shower. If a worker's shoes become soaked with a PCB fluid, the shoes should be discarded and the worker required to shower.

4. PCBs are irritants and eyes splashed with the fluids should be flushed immediately with large amounts of running water. Workers should then seek medical attention.

5. Women of child-bearing age should not be assigned to work involving potential exposures to PCBs. In our assessment, practical hygiene measures may not provide adequate protection for a woman or her unborn child. Our recommendation refers to day to day assignments only and should not be used as a means of disqualifying any female from any classification or otherwise adversely affecting any other term or condition of employment, such as promotions, shift assignments, and layoff selections. Avoidance of such assignments is a justification for an overtime bypass.

6. PCBs will decompose at very high temperatures such as those produced by flames, molten metal or an electric arc in a faulted capacitor or transformer. Hydrogen chloride, carbon monoxide, phenolics and aldehydes will be formed. Hydrogen chloride is highly irritating at low concentrations, thus giving ample warning of its presence.

7. Servicing a recently faulted transformer usually requires a self-contained breathing apparatus for protection against the PCB decomposition products. Faulted transformers can be under pressure from the decomposition gases and should be carefully drained only after cooling.

We would be glad to answer any questions that you may have pertaining to this subject.

JOSEPH DAMIANO

JD:mlf

Distribution: Principal Industrial Hygiene Contacts

cc: R. E. Atkinson, Alcoa Technical Center
D. R. Balok, Pittsburgh Office - 25
J. S. Boyt, Pittsburgh Office - 7
K. J. Brondyke, Alcoa Technical Center
J. T. Bunting, Pittsburgh Office - 20
T. W. Callahan, Alcoa Technical Center
R. J. Groholski, Alcoa Technical Center
S. J. Jack, Alcoa Technical Center
A. B. McKee, Alcoa Technical Center
R. K. Morrow, Massena Operations
L. J. O'Connell, Pittsburgh Office - 20
H. F. Pinge, Pittsburgh Office - 25
R. W. Porter, Jr., Pittsburgh Office - 13