DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

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August 22, 2006

Mr. Edwin A. Walker
8614 S. Main Street
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Dear Mr. Walker:

As an active participant in the process, you are aware that the Bethlehem Steel Corporation (BSC) site profile has undergone extensive review by the Advisory Board on Radiation and Worker Health (ABRWH). With the assistance of the Board's contractor, Sanford Cohen & Associates (SG&A), all technical aspects of the BSC site profile have undergone rigorous scientific scrutiny. The results of this independent review were discussed at a number of working group meetings that were open to the public. This review process has resulted in NIOSH making a number of technical revisions to the original site profile that was issued on March 31, 2003. We believe that this process has not only improved the scientific basis for our dose reconstructions at Bethlehem Steel, but also highlights NIOSH's commitment to conducting our work in an open forum that is as transparent to the public as possible.

At the final meeting of the Board's BSC working group on November 28, 2005, the remaining six issues to be resolved between SC&A and NIOSH were discussed in some detail. According to the transcript of that teleconference, the approach to be taken for all issues was agreed upon between NIOSH and SC&A, with the exception of finding number 2 that dealt with how NIOSH would address exposures from the cutting of uranium cobbles. At the end of this meeting, NIOSH committed to further investigate this issue by interviewing workers who were involved in the cutting of cobbles. With your assistance, a meeting was held with these workers on June 21, 2006. Although the workers' recall of events that occurred almost 50 years ago was not perfectly clear, it was obvious to NIOSH that the torch cutting of cobbled uranium rods could not be discounted. As such, NIOSH has revised the BSC site profile to include an exposure scenario for this activity.

NIOSH has recently updated the Bethlehem Steel site profile to address all the scientific issues that were raised by the ABRWH and SC&A. The significant changes that were made include:

1. Increasing the air concentration values for 1951 and 1952 to account for the possibility that the air samples taken by Health and Safety Laboratory personnel were not representative of the breathing zones of workers.

2. In 1952, when air concentrations were no longer bounded by rolling operations, NIOSH selected the highest recorded air sample, which was taken during a grinding operation, as representative of the breathing zone concentration for all workers.

3. An exposure scenario for the torch cutting of uranium cobbles was added.

4. The uranium ingestion model was revised to better reflect the air concentration and contamination conditions that existed at BSC.

5. The resuspension model was revised to increase the plausible bounding value for exposure from this pathway.

6. The external exposure model was revised to allow for exposure to contaminated clothing for up to two weeks between washings. This will increase the shallow dose to the skin to 1.8 rem per year from potential uranium contamination on clothing.

The revised version of the BSC Site Profile, which includes these changes, was approved for use on July 27, 2006 and is now posted on our web site. For your reference I have enclosed a hard copy version of this revised document. This version will be used to reconstruct the doses for those claims that have been on hold during the profile review process. Further, as with any technical change that NIOSH makes, we have begun to review previously completed dose reconstructions to determine what effect, if any, these changes might have on the calculated probability of causation. While it is too early to determine the magnitude of the change across cases, I can say that these changes will not always result in a higher probability of causation than would have been calculated using the previous version.

Subsequent to the BSC worker meeting on June 21, 2005 that was held in Hamburg, New York, you provided an e-mail to NIOSH on June 25, 2006 that summarized a number of issues you have related to the suitability of the Bethlehem Steel Site Profile for reconstructing radiation doses for workers at the Bethlehem Steel facility. Many of the issues you raise have been the subject of ongoing communications between yourself and NIOSH for over a year. Through numerous e-mails and in the letters, I have previously provided written responses to many of the issues raised in your current e-mail. In addition, other issues have been addressed during meetings of the Advisory Board working groups in which you participated as a representative of workers at Bethlehem Steel. As such, my responses to each of the 19 issues you raise are largely based on information that we have previously communicated. These are provided in Attachment 1 of this letter.

I want to personally thank you for the dedicated effort you put forth over the last several years on behalf of claimants from the Bethlehem Steel facility. Through your persistent efforts, you have helped to revise the technical basis document to reflect more accurately the exposure conditions of workers at the Bethlehem Steel facility.

Sincerely,

Larry J. Elliott, MSPH, CIH
Director
Office of Compensation Analysis and Support

Enclosure

Attachment

cc: ABRWH

Attachment 1
Responses to Issues Raised in Mr. Edwin Walker's June 25, 2006 E-mail

Issue #1

Bethlehem Steel's Site Profile was not completed before the Technical Based Document (TBD) was approved on March 30, 2003. Please explain.

The terms site profile and technical basis document are used interchangeably by NIOSH. Both terms are used to describe a document which provides a standard set of information for a facility that can be used in the dose reconstruction process. The Bethlehem Steel site profile, ORAU-TKBS-0003, that was issued on March 31, 2003 was the first version of the site profile for Bethlehem Steel. There have been two subsequent revisions to this document that were issued on June 29, 2004 and July 27, 2006.

The initial technical basis document for Bethlehem Steel was designed to provide an exposure estimate that accurately depicted exposure conditions at Bethlehem Steel, but used claimant favorable estimates where information was unavailable. The technical basis document for Bethlehem Steel, as a living document, has and will continue to be evaluated against any additional research findings that are discovered over the course of this program. OCAS has conducted (and continues to conduct) an extensive document retrieval and information gathering regarding the facilities for which it is responsible for conducting dose reconstruction. If a change is warranted, a revision to the TBD would be issued, and previously completed claims would be re-evaluated. In this manner, a timely decision was reasonably provided to claimants without sacrificing the ultimate accuracy necessary to provide a correct decision.

Issue #1.a

NIOSH was unaware of the existence of the 10" (10-inch) Bar Mill building at the time of the TBD approval. Why?

Actually, NIOSH was aware of the 10" bar mill area at the time the site profile was developed. Prior to the completion of the site profile, NIOSH reviewed documentation of two radiological surveys of the 10" bar mill area that were performed in 1976 and 1980[a,b]. The 1976 survey, conducted the U.S. Energy Research and Development Administration (ERDA), included direct measurements and smear samples of the rolling equipment that was used to form

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[a] LaMastra, A., 1976, "Investigation Report: Uranium Metal Rolling, 10" Bar Mill, Lackawanna Plant," report to D. L. Webster, Bethlehem Steel Corporation, June 29.

[b] DOE (U.S. Department of Energy), 1985, *FUSRAP Elimination Report for Bethlehem Steel Corporation, Lackawanna, New York.*

uranium rods. As indicated in the report, this survey found *no removable radioactivity* on any of the surfaces. The 1980 survey was conducted as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). At the time of this survey, the 10" bar mill equipment had been dismantled, so the investigators evaluated contamination levels in the area that the bar mill previously occupied, as well as the dismantled equipment. This investigation found that: *Radiological surveys of the plant area in which the rolling was performed and of the equipment used indicated the radiation levels were typical natural background for the area.*

Because no contamination was detected in the bar mill area or on the bar mill equipment in either survey, and the rolling equipment was no longer in its original location, NIOSH did not believe that a site visit to the rolling area would produce meaningful information.

Issue #1.b

Other buildings were involved, including the Blooming Mill (Reference Wayne Range Letter of June 7, 1976.). The purpose of the Blooming Mill was to reduce ingots to billets - (ingots) referred to in Government Reports of Bethlehem Steel Company but not acknowledged by NIOSH. Why?

The Range letter you reference mentions that the statements related to uranium activities at the site were the recollections of a contract officer more that 25 years after the activities occurred. The letter simply states that a suitable blooming mill and rolling mill were present at Lackawanna; the letter does not indicate or confirm the use of these facilities for uranium work at Lackawanna. Every document reviewed by NIOSH describing the rollings indicates that all billets were rough rolled at a separate facility (e.g. Simonds Saw and Steel or Allegheny-Ludlum). Finally, the estimates used to determine the air concentration for 1949 and 1950 are based on the Simonds Saw and Steel data and experience. The Simonds Saw and Steel uranium rolling operation was a precursor for the operations conducted at Bethlehem Steel.

Issue #1.c

NIOSH overlooked the 28,000 sq. ft. of unmonitored high Uranium concentration area (sub-basement open under the Cooling Bed). They also overlooked the Cooling Bed above. A total area of 56,000 sq. ft. unaccounted for, without any air data at all. Can this be explained?

While this area occupies a large portion of the facility, it does not represent a component that impacts either the previous or current evaluation of dose at Bethlehem Steel. This area was evaluated as part of the updates to the technical basis document, but was found not to be as limiting as the updated exposure models which were based on plausible worst-case occupational exposure conditions being assigned to all employees.

Discussions with workers have also provided evidence that the occupation of this area was intermittent. Previous estimates as well as the updated exposure model for Revision 2 provide for a 10 hour exposure during rolling days and for residual contamination during the remaining periods of time which account for exposures in all areas of the plant.

Issue #2

NIOSH never met with site workers until 16 months <u>after</u> Bethlehem Steel's TBD was approved (July 2004). Why? When at other facilities compensation was withheld until the site profile was completed.

While NIOSH did not hold a town hall meeting, each claimant was requested to participate in a Computer Aided Telephone Interview (CATI) and asked to provide information which would assist in the dose reconstruction process. Further, NIOSH developed exposure models that were believed to be plausible bounding upper estimates for exposure when data were unavailable. This is consistent with the dose reconstruction regulation and the associated implementation guides. The Bethlehem Steel Corporation site profile was developed to provide timely and accurate compensation decisions for claimants from Bethlehem Steel.

Issue #3

Four (4) Bethlehem Steel claimants were compensated prior to the TBD approval on March 30, 2003. What was their criteria for compensation?

NIOSH has reviewed all completed dose reconstructions from Bethlehem Steel and cannot find evidence that we approved any dose reconstructions for Bethlehem Steel claims prior to March 31, 2003, the date the original Bethlehem Steel Corporation site profile was issued for use.

As with all claims, NIOSH does not determine compensation. The adjudication of a claim and decision on compensability is the responsibility of the Department of Labor.

Issue #4

Once Bethlehem Steel's TBD was approved, NIOSH began denying claimants without having a completed site profile. Please explain.

As discussed in the response to question 1, the site profile and technical basis document for Bethlehem Steel are the same document. The original site profile was issued on March 31, 2003, and we can find no evidence that we approved any dose reconstructions for Bethlehem Steel claimants prior to the March 31, 2003 issuance date of the site profile. We did find that in some of the very early dose reconstructions (i.e., those approved on April 7, 2003), the dose reconstruction report references a draft technical

basis document, dated December 2002, rather than the March 31, 2003 revision. This was an administrative oversight on our part, as the dose reconstructions were completed in accordance with the approach described in the March 31, 2003 revision.

Issue #5

Four (4) government-owned facility claimants were compensated without a Site Profile, TBD, or Dose Reconstruction prior to Bethlehem Steel's TBD approval. Why should Bethlehem Steel claimants be treated differently?

If we have interpreted your comment correctly, classes of workers at the four facilities to which you are referring were legislatively granted exemption from dose reconstruction under EEOICPA when certain specified criteria are met. The decision to legislatively add these classes to the Special Exposure Cohort for these facilities is not related in any way to NIOSH's dose reconstruction efforts under EEOICPA.

Issue #6

1949-1950 No records exist at all. How can NIOSH say that "nothing went on" when Bethlehem Steel had contracts to do <u>experimental work</u>? AT(30-1) -1279 and AT(30-1)-1156. The technical information resulting from that work was of a classified nature. And the government admits destroying all documentation for that period. NIOSH had no knowledge of what went on in 1949 to 1951. Can this be explained in detail?

The covered period for Bethlehem Steel was based on a letter that indicated rollings of uranium occurred there between 1949 and 1951[c]. The reported purpose of these rollings was to identify the required pass schedules that could be used in the design of a rolling mill at the Fernald plant. Based on documents acquired by NIOSH, the first rolling at Bethlehem Steel, for the purpose of developing the Fernald design, took place on 4/26/1951. This rolling is referred to as experimental rolling number 1 in AEC documents. Either the rollings started in 1949 for a different purpose or the rollings started in 1951. Without the Range letter, there is no indication of rollings occurring at BSC prior to 1951. The decision was made by NIOSH, however, that the recollection of monthly rollings beginning in 1949, as cited in the Range letter, cannot be refuted and to give the benefit of doubt to the claimant. The site profile was, therefore, written to assume monthly rollings starting in 1949.

As previously discussed, the rolling dates cited in the Range letter were based on memories from more that 25 years ago. Historical records acquired by NIOSH indicate that these memories contain at least one factual error. AEC

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[c] Range, W., 1976, letter to David M. Anderson (Bethlehem Steel Corporation), Energy Research and Development Administration, June 7.

documentation indicates the rollings ended, not in 1951, but in 1952. NIOSH presented this evidence to the DOE, and the covered period was expanded from 1949 to 1952.

The dose reconstruction model at Bethlehem Steel has always included an estimate for exposure during the 1949 and 1950 time period. The contracts referenced in your question are the contracts for National Lead of Ohio (NLO) to operate Fernald. Fernald did not have the ability to conduct oversight of off-site rolling operations until the issuance of amendment 4 to contract AT(30-1)-1156 which was set forth on June 27, 1951. Finally, NIOSH has obtained many documents regarding the Atomic Energy Commission's rolling program that was conducted from 1943 and later during its research activities to improve the uranium quality for Hanford. No documentation of the rolling of uranium in 1949 or 1950 at Bethlehem Steel has been found. Thus, the NIOSH Bethlehem Steel Site Profile and dose reconstruction of Bethlehem Steel claims gives substantial benefit of the doubt to the claimants for the years 1949-1950.

Issue #7 - SURROGATE INFORMATION

Surrogate information used by NIOSH was obtained from Simonds Saw, a facility approximately one tenth the size of Bethlehem Steel Company.

Issue #7.a

Not one procedure at Simonds Saw was comparable to Bethlehem Steel's operation not even remotely close to allow for a comparison. Please explain.

First, it is important to point out that the site profile used Simonds Saw data to reconstruct exposures for workers in 1949 and 1950, when no air monitoring data were available for Bethlehem Steel. While NIOSH acknowledges that there are differences between these two facilities, we are confident that the site profile adequately accounts for these differences and provides plausible bounding upper estimates of internal uranium exposure for claimants. While a more detailed evaluation is provided in the revised site profile, the following discussion highlights the main reason why NIOSH believes the Simonds Saw data is appropriate for reconstructing exposures at Bethlehem Steel and why these exposures adequately bound the exposures experienced by workers in 1949 and 1950.

A detailed review of the air concentrations that result from the mechanical processing of uranium (e.g., rolling, grinding, shearing, etc.) has been conducted by NIOSH. In these reviews, it has been observed that the operation with the potential for generating the highest airborne levels of uranium is that from rolling operations. This is particularly true for rolling operations that did not use a protective coating on the uranium or used a protective coating of lead. As the earliest rolling at Simonds Saw did not use a protective coating on the uranium and no relevant ventilation was used, this operation produced extremely high

levels of uranium in the air. The Bethlehem Steel site profile selected the 95th percentile air concentration value measured at Simonds Saw (~600 times the maximum allowable concentration) and assumed that all Bethlehem Steel claimants breathed this concentration at a heavy work inhalation rate for every minute of a 10 hour work day.

The use of Simonds Saw and Steel data to evaluate exposures at Bethlehem Steel has been the subject of extensive review by the Advisory Board and its contractor, Sanford Cohen and Associates. The relevance of the use of Simonds Saw data has been discussed at length, and the consensus opinion among the Board, SC&A and NIOSH is that the Simonds Saw data adequately bound exposures for Bethlehem Steel workers in the 1949 and 1950 time period.

Issue 7.b

In 1948 at Simonds Saw, many safety procedures were implemented while working with Uranium, but those safety procedures were never introduced to the experimental process at Bethlehem Steel from 1949-1952. Why? Please explain.

We cannot answer why certain administrative procedures to reduce exposure potential were not adopted at Bethlehem Steel Corporation (BSC). We can say that certain aspects of the Simonds Saw and Steel pilot runs (like the lead bath) were utilized in the rollings at BSC to reduce exposure potential.

The dose reconstruction model being used by NIOSH for Bethlehem Steel is based on monitoring data taken at Simonds Saw prior to the installation of ventilation and the floor gratings. These data were selected to specifically avoid the issues you have raised in previous correspondence. Several documents from the AEC Health and Safety Laboratory (HASL) describe the incremental addition of ventilation and gratings at Simonds Saw and the impact that it made on dust levels. Furthermore, as was discussed during our meetings with SC&A, the air measurement data were collected during the rolling of uranium without benefit of protective coating on the uranium bars. Because the lead bath used at BSC provided improved resistance to oxidation compared to bare metal, the application of Simonds Saw air concentration data is likely to be an overestimate of the actual conditions at BSC.

Issue #7.c

Personal monitoring took place at Simonds Saw, but such personal monitoring was never considered or conducted at Bethlehem Steel. Why?

Again, we cannot say why personal monitoring was not done at BSC. It would be speculation on the part of NIOSH to offer reasons as to why bioassay samples or additional breathing zone samples were not collected at Bethlehem Steel. NIOSH has developed an exposure model for BSC claimants based on existing air sampling data. We believe that the claimant favorable assumptions built into this

model adequately bound the upper exposure conditions experienced by workers at this facility.

Issue #7.d.

Simonds Saw site profile was not completed at the time Bethlehem Steel's TBD was approved, but NIOSH was using data from Simonds Saw to calculate Bethlehem Steel's Dose Reconstruction and deny claims.

In keeping with the guidance contained in parts 82.16 and 82.17 of 42 CFR Part 82, Methods for Radiation Dose Reconstruction Under the EEOICPA, the site profile relied on data from Simonds Saw that conducted a similar operation using a similar source term. Working conditions at Simonds Saw and Steel were the subject of extensive analysis by HASL and others regarding practices and health and safety reports over the entire time that uranium was rolling. These data, which are many times higher than the data obtained from Bethlehem Steel in the 1951 and 1952 time period, were used to support the analysis of claims during the 1949 and 1950 time periods.

Issue #8 - AIR SAMPLE LOCATION & DATA

Issue 8.a

After four years of NIOSH stating the "highest area of contamination was at the Rollers, we find all the breathing zone samples (approximately 9) were taken at the Shear Area 500 feet from the Rollers. Please explain.

Documentation that the rollers had the highest exposures is far broader than simply evaluating the Bethlehem Steel data. Harris and Kingsley provided data based on the extensive Health and Safety Laboratory (HASL) analyses of exposure in their 1958 document regarding the Industrial Hygiene of Uranium Fabrication. This document and other reports have typically noted that the rollers had the highest exposure. The current site profile for Bethlehem Steel also discusses that other areas may have higher levels of airborne uranium contamination during periods in which uranium was preheated in a salt bath.

It is incorrect, however, to state that all the breathing zone (BZ) samples were obtained at the shear. Breathing zone samples in part include such descriptions as "BZ transferring bar from bath to 1st stand", "Runout table BZ", "Lead furnace loading rods", "runout table and shearing composite BZ", and "BZ salt bath 3 rods".

Issue #8.b

Many of the original documents are undated, illegible or incomplete with no "sample description". No dates, messy at best. The person that took these samples would not testify for NIOSH - Why? If NIOSH had the proper records

why did they need to talk to Dr. Breslin to substantiate the data? Remember this was a Technical Document. The air sample data should have been researched thoroughly prior to the TBD document approval. Explain please.

NIOSH has and will continue to follow-up on sources of information that might become available to assist in the dose reconstruction process. For example, NIOSH had previously obtained the input of Dr. Naomi Harley who at the time was the counting technician at HASL for these samples. NIOSH was not aware that any member of the original Health and Safety Laboratory (HASL) air monitoring team was still alive at the time the first site profile for Bethlehem Steel was released. Through additional professional contacts and considerable searching for other HASL personnel, NIOSH located Dr. Breslin. NIOSH sought information from Dr. Breslin, a technical expert in the field, regarding the interpretation of certain air sample results.

We asked that Dr. Breslin allow NIOSH and SC&A to interview him, and he declined. The reasons provided by Dr. Breslin at that time were the poor status of his health and his inability to recall specific facts and/or events that occurred so long ago. This resulted in NIOSH using a claimant favorable interpretation of the air sample data which led to an increase in the estimate of exposures used in the revised site profile. Finally, to address the legibility issue, NIOSH obtained the original air sample records from the Department of Energy to verify the data for difficult to read values. SC&A confirmed all but one result was legible.

Issue #9

GAMMA RAYS - NIOSH states no Gamma rollings took place at Bethlehem Steel. Refer to document HW -22474 Finished Rollings Done at Bethlehem Steel -" 4 to6 12 foot long gamma extruded rods".

Issue #9.a

If no gamma rollings were done, then why does the "Elimination Analysis" refer to "The survey included direct measurement of alpha and beta-gamma radiation levels"? January 25, 2005 Findings - Item #8 (Beta and Gamma).

I would like to clarify that the terms alpha, beta, and gamma phases are all related to the structure of the metal (not the radioactivity content) following rolling at various temperatures (please see the figure below). The gamma extruded rods were rods extruded at temperatures higher than the temperature used when rods were rolled. The gamma in this case refers to the lattice structure of the metal grain; it does not refer to radioactivity. The gamma referred to in (9.a.) above is gamma radiation which can also be referred to as photon radiation. Dose from photon (gamma and x-rays) radiation estimates have been included in all revisions of the BSC TBD for all years. The following figure from HW-34868, Nuclear Metallurgy Lectures from 1955 shows the various physical structures based on

rolling temperatures. These terms have no relationship with radioactivity in this context.

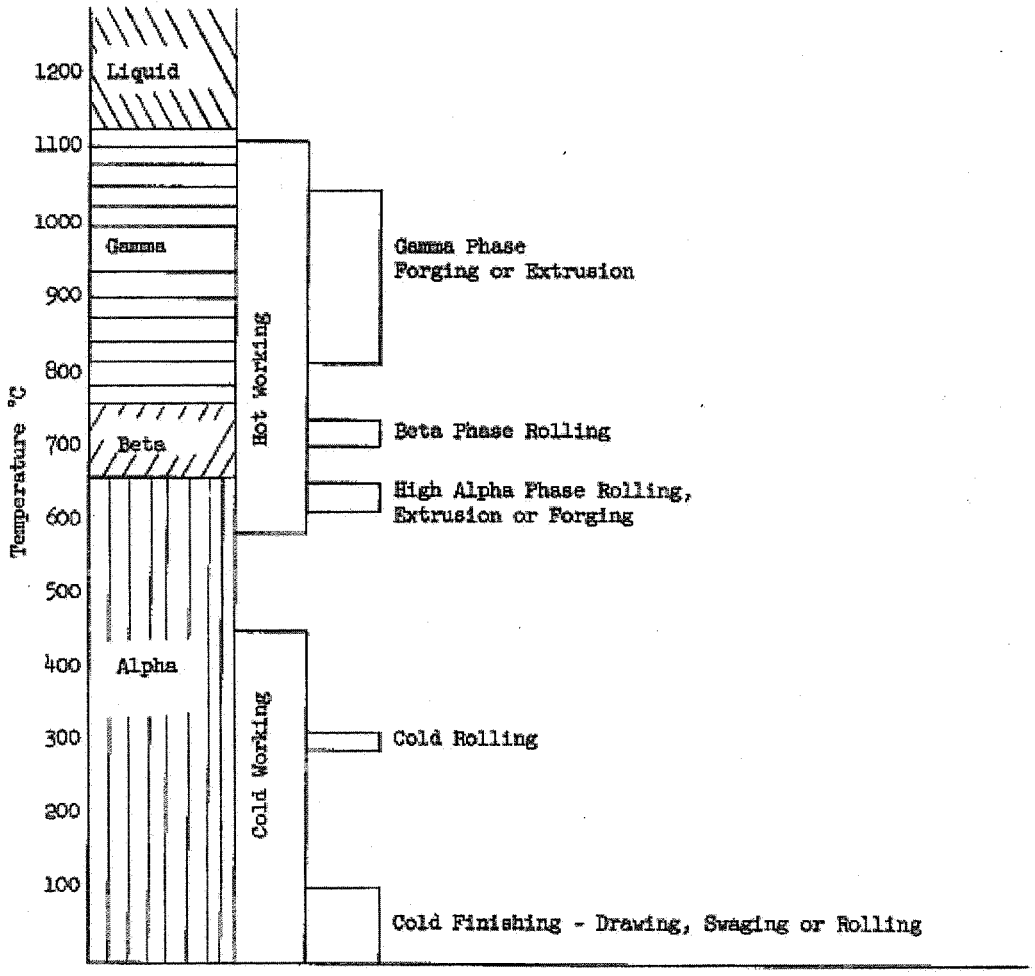

FIGURE 1. Fabrication Temperatures for Uranium

Issue #10

"BBW" - "Best Bar Mill in the World" No other facility in the World was doing continuous Uranium rolling. We were Guinea Pigs.

When doing experimental work you are working with the <u>unknown.</u> The government admits (documented) to destroying these records. Please explain.

The description that the government admitted to destroying the records was provided in a letter from someone not involved in the program. In our data capture efforts, NIOSH has obtained a significant number of documents from HASL and Hanford regarding Bethlehem Steel.

These documents indicate that the experimental work conducted at Bethlehem Steel was conducted on a very limited basis. The site profile has incorporated exposure conditions during which all employees are assumed to perform the highest exposure job for 10 hours per workday. This significantly overestimates the time required for an operation that involved the small number of billets processed during the experimental phase. During the 1951 and 1952 rollings, air sample data, surface contamination data and production records exist for the uranium rollings at Bethlehem Steel.

Issue #11

PERSONAL PROTECTIVE EQUIPMENT

No personal protective equipment was issued at Bethlehem Steel such as: Glovebox, Masks, Hoods, Film Badges, etc. How can accurate Dose Reconstruction be modeled without reliable air data or personal monitoring on workers?

Dose reconstruction at Bethlehem Steel was based on modeling exposure conditions that used air monitoring results and production data. Each version of the Bethlehem Steel site profile provided consistent guidance to the dose reconstructor that no personal protective equipment was used at BSC. The Advisory Board as well as their contractor reviewed and concurred with the approach.

Issue #12

LOST URANIUM

Issue #12.a.

Of the approximately 48+ rollings in Bethlehem Steel's TBD only 27.083% of those rollings are actually documented.

NIOSH has obtained detailed documentation from a number of sources which provide the specific sites that rolled uranium for the Atomic Energy Commission in the late 1940s. A detailed review of all the information on these early rollings casts serious doubt on the involvement of Bethlehem Steel in the rolling of uranium in 1949 and 1950. The time period of 1949-1950 precedes the plans to centralize the rollings at Fernald where the concept of using a continuous rolling mill for uranium rolling was proposed. However, as detailed in my earlier response, NIOSH has chosen to provide a claimant favorable evaluation of potential exposure during the covered period. The inclusion of additional rollings in 1949 and 1950 doubles the covered exposure period and significantly increases the dose calculated for workers at Bethlehem Steel.

Issue #12.b

Using NIOSH's figures to calculate the amount of lost Uranium:

Lost Uranium for 48+ rollings at 8 pounds per billet equals 13 tons of lost Uranium in 4 years of rollings at Bethlehem Steel.

Amount of "Lost Uranium": 13 tons of radioactive material left on the site according to NIOSH's calculations. How did NIOSH account for this?

Because scrap recovery was an important component of the AEC uranium program, NIOSH does not believe that 13 tons of material were left behind by AEC at Bethlehem Steel. As a valuable metal, fines and scraps of uranium were picked up and vacuumed. This has been consistently reported in various documents and in interviews with Bethlehem Steel workers. The amount you speculated that was lost also includes cropping the ends of the billet. These cropped ends were also recovered as part of the scrap program but did not contribute to material which could be used by Hanford. Of these 48+ rollings, only 16 are documented. Without documentation to the contrary, the remaining rollings were assumed to have occurred, which provides for a claimant favorable determination of dose. The NIOSH exposure model accounts for the inhalation and ingestion of residual contamination after rollings. The residual contamination model, which accounts for the spread of uranium in the plant from rolling operations, has been the subject of detailed discussion of the Advisory Board's working group.

Issue #13

ROUGH ROLLING

NIOSH states only finished rolling took place at Bethlehem Steel. However, the Government documentation verifies that the government purchased rough rollers as well as finish rollers for Bethlehem Steel. This error is further evidence of the lack of proper (valid) research by NIOSH.

The "government documentation" that you reference is a report of a meeting held on 5/28/1951 where a proposal was made to use BSC for production rolling until the Fernald mill was operational (estimated mid 1952). It was proposed during this meeting that new rolls be purchased for the roughing and finishing mills at BSC. However, all documents prior to and following that meeting continue to indicate BSC received smaller diameter rods that were rough rolled at other mills. As previously discussed in question 1.b, this report does not indicate or confirm the use of these roughing facilities for uranium work at Lackawanna.

Issue #14

SALT BATH SOAKING TIME REQUIREMENTS & LEAKS

There was a 4-hour loss of time with a salt bath leak.

Accident: September 22, 1952

- ***303 billets rolled, 9 billets at a time to charge the salt bath***
- ***23 minutes average time to soak per charge***
- ***759 minutes total time for soaking time***
- ***12.5 house needed for soaking only.***

This work cannot be done in a 10-hour working day. It is impossible for this work to be done in a 10-hour working day based on the time requirements.

Please explain this impossibility. How many other inconsistencies and invalid claims are in these reports?

Fernald representatives reported in FMPC-17 (April 1952) that the rollers were running a billet every two (2) minutes when they hit their stride. Soaking time is not likely to be the limiting factor because billets were removed one at a time and could be replaced to keep the process moving. NIOSH has developed an exposure model such that the employees worked 10 hours at each of the rollings. Even if there was some deviation on one rolling day in the time required, the profile provides a very claimant favorable estimate for days when 30 billets were rolled.

Issue #15

MANUAL LABOR

Far exceeds the rolling process at Simond Saw & Steel

- ***o Sledge hammer rods into shape***
- ***o Moving rods across salt bath with crowbars***
- ***o Removing cobbles***
- ***o Hand held Geiger counters***

As has been provided in previous correspondence with you, manual processes were cited by the AEC as being one of the factors that elevated exposures. One of the largest factors involved the dragging of the rods between various stations and

resuspending the dust (this includes the example of reintroducing the rods). Simonds Saw and Steel rolled large quantities of uranium for long periods of time with no protective coating resulting in significant amounts of uranium on the floor. This is why grating was later installed at Simonds. The various duties you have mentioned have been discussed at length during meetings of the Advisory Board and with SC&A, and a bounding exposure has been established for workers at Bethlehem Steel. Finally the number of workers does not impact the magnitude of the 95th percentile air concentration value that NIOSH has chosen to use in the dose reconstruction for workers at BSC. As you have indicated in your description of a state-of-the-art facility and is described in documents on the facility, the 10" mill was designed to minimize manual labor.

Issue #16

GRINDING LOCATION

No grinding was recognized or incorporated in BSC's TBD until long after claimants were denied. This is a critical error and needs to be explained.

NIOSH changed its analysis that the highest air concentrations of uranium were consistently measured at the rollers based on extensive review of the rolling processes employed at Bethlehem Steel. It became obvious that the salt bath technology employed during the later years (1951 and 1952) significantly reduced air concentrations of uranium over the technology employed in the earlier period. The reduction was so significant that other operations became the bounding exposure scenario. In keeping with the claimant favorable assumptions used in the site profile, NIOSH has adopted the highest exposure scenario for assigning intakes to workers in the later years. Based on an analysis of the measured air samples, grinding operations provide the highest potential for worker exposure during the latest time frame at Bethlehem Steel when salt bath heating was used exclusively for the billets. NIOSH will assume that all workers, regardless of job category, were exposed to these air concentrations 10 hours per day for each day of rolling. The final outcome of this will be that the dose determined during this later time frame based on grinding data will be lower than the dose determined previously.

Issue #17

SKETCH FOR BETHLEHEM'S ROLLING PROCESS

Submitted into record was a sketch as a description of a 10" rolling mill. This sketch was of a completely different rolling process. Explain why the wrong sketch was used. On January 25, 2005 at the California meeting during SC&A's presentation, no one challenged the content of the sketch where a sheet metal mill was displayed not a rolling mill. Also, it is very evident that the 56,000 sq. ft. Cooling Bed area was not depicted and went unnoticed by all.

As described in previous correspondence, the issue you raise was from a presentation by SC&A to the Advisory Board. This information did not impact our dose reconstruction efforts at that time nor have they changed our current methods, which have been extensively scrutinized during our discussions with SC&A. While we have included updated drawings and photographs and additional background for the site in the revision to the technical basis document, these again do not change the underlying method or end results of the analysis. The Board was copied on my previous correspondence regarding this issue.

Issue #18

NO CONTAMINATION WHEN ROLLERS STOP

Finding dated January 25, 2005 - Explain observation #3.

The statement by NIOSH asserts that when the rollers stopped: "The generation of airborne activity would cease." That observation #3 is invalid. NIOSH ignored or refused to address the lack of invalidity of Observation #3. Explain the basis for that conclusion.

NIOSH originally considered the residual activity following the day of rolling to be a small route of exposure that was accounted for by other overestimating assumptions. The latest revision of the TBD now accounts for the resuspension of uranium that was dispersed throughout the facility. This results in a 1.7% increase in the amount of inhaled uranium for 1949 and about 0.2% for 1950 (Simonds Saw and Steel data), for 1951, and 1952.

The Bethlehem Steel site profile does not assume that the facility was decontaminated in one day. In fact, the revised site profile employs a model that was extensively reviewed during the comment resolution process. This new model accounts for the fact that the production of uranium was a very small part of the production activities at Bethlehem Steel. As such, the amount of uranium available for resuspension would be reduced over time by the dust that was generated during the normal steel manufacturing process. Although you are concerned about the accumulation of uranium on the plant rafters, there is no scientific basis for the selective concentration of uranium dust over the steel dust at these locations.

NIOSH sent a document of 40 pages, 7 pages were missing. They never resolved this specific issue.

The following e-mail response was provided to you by Jim Neton on December 22, 2005.

Dear Mr. Walker,

As I indicated in my October 26th response to your original inquiry, a review of the documents in the PDF file in question revealed that they are complete. While I can't explain the reason for the non-sequential page numbering in the PDF file, a close review of the document shows that there

are no missing pages. To help explain why we believe this to be the case, I've attached the section of the PDF file which contains the non-sequentially numbered pages.

Based on the imaging software's numbering sequence, pages 16,18,20,22,24,26, and 28 appear to be missing. One can see, however, that the memo, labeled as page 15 by the imaging software, states that a copy of the minutes of the May 28, 1951 meeting are attached. Inspection of the next page (labeled as page 17 by the imaging software) reveals that this is indeed the first page of the minutes of this meeting. In fact, the upper right hand corner of the meeting minutes states that the document consists of 6 pages. If one steps through the following pages, it can be seen that the original pages were sequentially numbered and that all 6 pages are there.

Again, I can't explain why the imaging software didn't label these pages consecutively, but all the documents that we intended to send in our September 12th e-mail to Arjun are included in the PDF file. There are no missing pages in this transmittal.

Issue #19

BETHLEHEM STEEL COMPANY: A STATE-OF -THE-ART FACILITY

During 1949 - 1952 Bethlehem Steel Company was a state-of-the-art facility with no comparable facilities Worldwide. There are no other facilities comparable for comparison worldwide. Please explain where NIOSH data was obtained.

This question has been discussed in previous answers. As stated, air monitoring measurements were taken at Bethlehem Steel during these operations. This data was supplemented by taking select measurements at other facilities to provide a claimant favorable analysis of exposure, which when coupled with the many claimant favorable assumptions regarding time, solubility, particle size, and location provide a very claimant favorable analysis for determination of the probability of causation.