

Evaluation of Chemical Processing Plant (CPP) Dosimetry for SEC00219

Timothy D. Taulbee, PhD, CHP
Lara Hughes, PhD, CHP
W. Mitch Findley, CHP

National Institute for Occupational Safety and Health
Division of Compensation Analysis and Support



Overview

- Background on Dosimetry
- Review of INL claims in NOCTS
- Review of INL Dosimetry for Data Gaps
- Comparison of Health Physics Monthly Reports vs. Dosimetry Records
- Review of INL Dosimetry Procedures



Background on Dosimetry at INL

- One badge one area methodology
 - If a worker who routinely worked at MTR went to CPP they left their MTR badge at MTR security checkpoint and picked up a Temporary Badge at CPP.
 - Visitors picked up temporary badges upon entrance to CPP
- Dosimetry Records
 - CPP Main Badge Reports (Main codes 5, 53, 55)
 - CPP Temporary Badge Reports
 - CPP Construction (CX) Reports (codes 11, 113, 115)



• Example of CPP Badge Report

- Phillips Petroleum
- AEC
- NRF
- Subcontractors
 - FC Torkelson

U. S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
PERSONNEL METERING BRANCH

CONTRACTOR: PHILLIPS PETROLEUM CO. AREA: 020 CPP

PERSONNEL EXPOSURE REPORT

NAME	FILM BADGE NO.	CONT CODE	PERIOD ENDING			AREA CODE	REASON CODE	BETA EXPOSURE	GAMMA EXPOSURE	NEUTRON EXPOSURE	TOTAL EXPOSURE	IRREG CODE
			NO.	DAY	YR.							
[REDACTED]	661065	089	07	29	65	05	01	0000	*0000			089 = FC Torkelson
[REDACTED]	661113	001	07	29	65	05	01					001 = AEC
[REDACTED]	661125	001	07	29	65	05	01	0000	*0000			
[REDACTED]	661233	002	07	29	65	05	01	0000	*0000			002 = Phillips
[REDACTED]	661277	02	07	29	65	05	01	0000	*0000			
[REDACTED]	662001	089	07	29	65	05	01	0000	*0000			089 = FC Torkelson
[REDACTED]	662002	089	07	29	65	05	01	0000	*0000			
[REDACTED]	662011	001	07	29	65	05	01	0000	*0000			
[REDACTED]	662034	001	07	29	65	05	01	0000	*0000			
[REDACTED]	662136	001	07	29	65	05	01					
[REDACTED]	900310	002	07	29	65	05	01	0000	*0000			
[REDACTED]	900407	002	07	29	65	05	01	0000	*0000			
[REDACTED]	900683	002	07	29	65	05	01	0000	*0000			
[REDACTED]	900850	002	07	29	65	05	01	0000	*0000			
[REDACTED]	901137	002	07	29	65	05	01	0000	*0000			
[REDACTED]	061101	005	07	29	65	05	10	0000	*0000			005 = Westinghouse (NRF)
[REDACTED]	061552	005	07	29	65	05	10	0000	*0000			
[REDACTED]	061574	005	07	29	65	05	10	0000	*0000			

SRDB 143068



- Example of Temporary Badge Report
 - News Reporter
 - Phillips
 - other areas
 - AEC Personnel
 - Construction Trades
 - H.S. Wright
 - Torkelson
 - Vendors
 - CocaCola

ID - 100 (R-4-00) *Chickie md*

TEMPORARY BADGE REPORT 076

44-13-0

AREA OP2 PAGE # 1 REPORT DATE 11-5-65

TEMP. BADGE NO.	NAME	EMPLOYER (SPELL OUT)	DATES USED	PERMANENT BADGE NO.	BETA	GAMMA	NEUTRON
356834	[REDACTED]	Blackfoot News	11-5-65		0	—	
356870	[REDACTED]	Inland Trgan.	11-5-65		0	—	
356819	[REDACTED]	Phillips	11-5-65		0	—	
355530	[REDACTED]	Phillips	11-1-5-65		0	—	
356852	[REDACTED]	Phillips	11-3-65				
355	[REDACTED]	H.S.Wright	11-1-5-65		0	—	
356865	[REDACTED]	AEC	11-5-65		0	—	
356844	[REDACTED]	Phillips	11-3-5-65	01-0841	0	78	
356875	[REDACTED]	Wiscomb Co.	11-4-65		0	—	
355527	[REDACTED]	Phillips	11-1-5-65		0	—	
356857	[REDACTED]	Torkelson	11-4-5-65		0	—	
356860	[REDACTED]	Torkelson	11-4-5-65		0	—	
355515	[REDACTED]	Phillips	11-1-5-65		0	—	
355538	[REDACTED]	Phillips	11-1-5-65		0	—	
355507	[REDACTED]	Phillips	10-28/11-5-65		0	—	
355515	[REDACTED]	CocaCola	11-1-5-65		0	—	
356887	[REDACTED]	H.S.Wright	11-4-65		0	—	
355519	[REDACTED]	H.S.Wright	11-3-5-65		0	—	
356877	[REDACTED]	AEC	11-5-65		0	—	
356863	[REDACTED]	Phillips	11-5-65		0	—	

SRDB 143042



- Example of CX Badge Report

U. S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
PERSONNEL METERING BRANCH

CONTRACTOR: **PP CONSTRUCTION** AREA: **2** **CX**

PERSONNEL EXPOSURE REPORT

NAME	FILM BADGE NO.	CONT CODE	PERIOD ENDING			AREA CODE	REASON CODE	BETA EXPOSURE	GAMMA EXPOSURE	NEUTRON EXPOSURE	TOTAL EXPOSURE	IRREG CODE
			MO.	DAY	YR.							
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0120		120	
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0050			
[REDACTED]	[REDACTED]	073	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	112	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01					14
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	03	16	64	05	13					14
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			
[REDACTED]	[REDACTED]	007	04	09	64	11	01	0000	*0000			

30-171088

007 = H.K. Ferguson

073 = Misc. Construction

112 = H.S. Wright

NOCTS 9852



Background Summary

- One badge one area
- Person's dosimetry could appear on one of several reports
 - CPP Main Dosimetry Report (05, 053, 055)
 - CPP Temporary Dosimetry Report
 - CPP Construction (CX) Dosimetry Report (11, 113, 115)
- *At this time DOE is much better equipped to identify work location for construction trades workers than NIOSH*



Review of NOCTS Claims

- 1753 INL claims as of April 2015
- Reviewed to determine whether employment period was within the proposed SEC
 - 872 claims (49.7%) did not work during the SEC period
 - 881 INL Claims with employment during SEC Period
- Reviewed CATI, Dose Reconstruction Report, and DOE file of the 881 INL claims with employment during SEC to identify CPP workers.
 - 320 claims (36.3%) worked at CPP during SEC period AND had an identifiable CPP badge of some kind (regular, temp, visitor, or CX)
 - 529 claims (60.1%) had no indication of work at CPP
 - 32 (3.6%) claims need further follow-up



Review of NOCTS Claims

- Why additional follow-up
 - *DOE provided only annual summary information IF:*
 - *Lifetime External Dose < 500mrem OR > 50 rem*
 - *Annual summaries do not provide location information*
 - *Construction Trades (CX Dosimetry Printouts)*
 - *CX = CPP Construction*
 - *DOE did not send NIOSH these reports when we requested the CPP dosimetry records. This was a miscommunication.*
 - *NIOSH did not identify that this subgroup was missing until week of June 22nd during our evaluation.*
 - *NIOSH has requested these CX reports.*



Review of CPP Dosimetry for Gaps

- CPP Dosimetry Reports (1963-1974)
 - *3 months missing*
 - *January 1970*
 - *December 1970*
 - *December 1971*
- Temporary Badge Reports (1959-1976)
 - *None appear to be missing*
 - *Note: Number of construction trades appear to be significantly reduced in 1970s*
- CX Dosimetry Reports
 - *Requested but not yet received by NIOSH*



Comparisons of Monthly Health Physics Reports vs CPP Dosimetry

- Reviewed the monthly Health Physics reports to determine how many dosimeters the site reported were processed versus how many dosimeters we found in the dosimetry printouts.
- Goal is that if the site indicated that they processed 500 dosimeter badges in a month and we have 500 dosimeter results then we can be fairly sure we have all of the results.
- Reviewed 1963 through March 1970

SRDB 125961



Comparisons of Monthly Health Physics Reports vs CPP Dosimetry

- *Example: August 1965*

- *Monthly Reports = 502*
- *Dosimeter Printouts = 509*
 - *Difference = +7*

- *Very good agreement on a month by month basis*
- *For this month slightly more results on the printouts than monthly reports.*
 - *Cutoff dates, late returns, and carryovers*

Mr. J. W. McCaslin
MS-12-65A
September 1, 1965
Attachment 1
Page 3

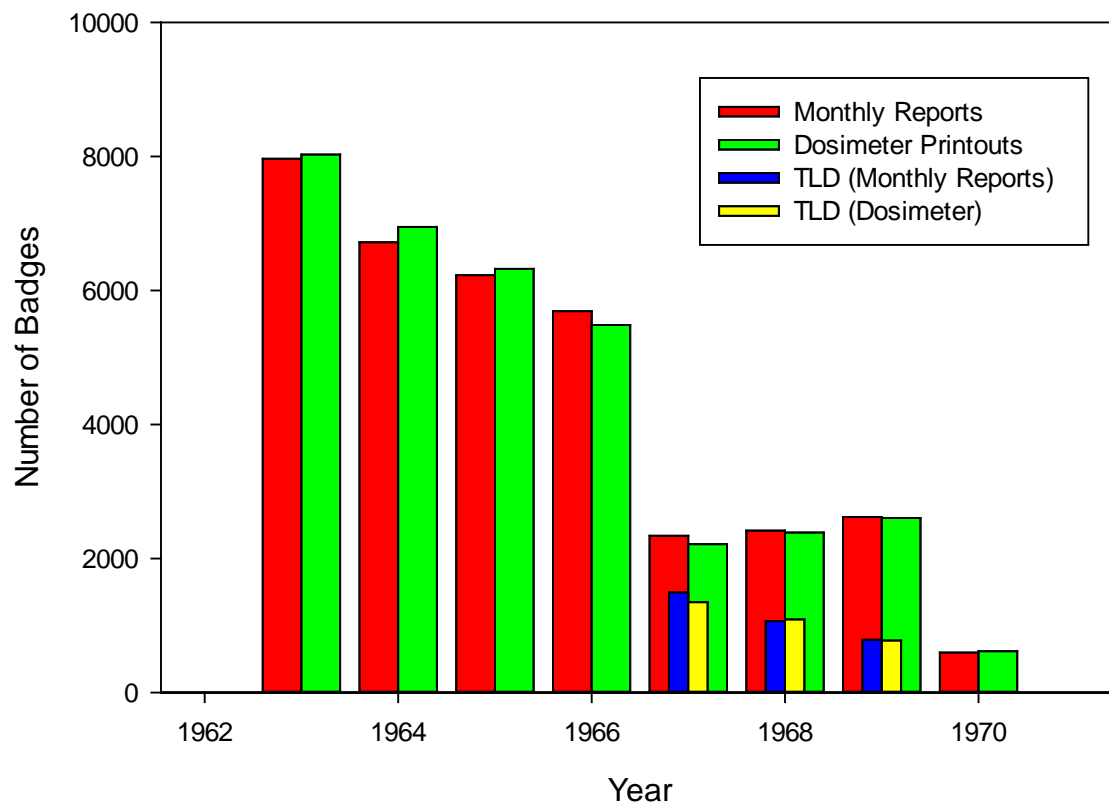
Period	EXPOSURE BADGE SUMMARY				
	Badges Recorded		Readings Greater Than	High Readings (mrem)	
	PFCo - Others		Administrative Levels	Skin	Penetrating
<u>Monthly Schedule</u>					
CFA 7-28 thru 8-24	20	0	0	0/740	0/740
LAUNDRY 7-28 thru 8-24	5	0	0	0/165	0/165
<u>Four Week Schedule</u>					
TRA 7-23 thru 8-19	946	164	0	600/375*	0/605**
CPP 7-30 thru 8-26	418	84	502 Total	1240/450	270/480***
SPERF 7-8 thru 8-4	163	44	0	0/0	0/0
TAN 7-29 thru 8-25	322	129	0	0/470	0/470
LPT 7-15 thru 8-11	25	17	0	0/120	0/120
LET 7-15 thru 8-11	134	22	0	0/630****	0/630****
CX(CPP construction) 7-30 thru 8-26	0	63	0	0/60	0/60
MX(TRA construction) 7-22 thru 8-18	2	80	0	0/90	0/90
AX(TAN construction) 7-29 thru 8-25	0	9	0	0/40	0/40

* includes late pull, 520/330 high skin for four week period
 ** includes late pull, 0/510 high penetrating for four week period
 *** includes late pull, 1240/450 high penetrating for four week period
 **** includes late pull, 0/400 high penetrating and high skin for four week period

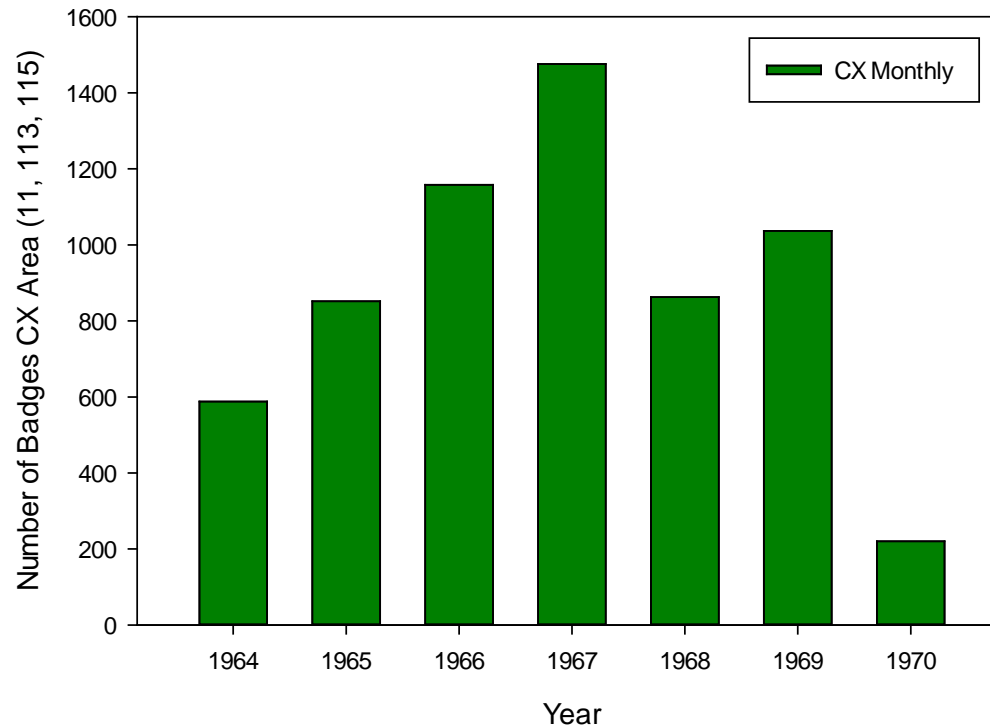
SRDB 125961



CPP Main - Annual Comparison



CPP Construction (CX) - Annual Data



Review of INL Dosimetry Procedures

- *One badge one area methodology*
 - If a worker who routinely worked at MTR went to CPP they left their MTR badge at MTR security checkpoint and picked up a Temporary Badge at CPP.
- *In October 1969, the INL site began to explore methods to reduce the number of temporary badges being assigned.*



Review of INL Dosimetry Procedures

- *In December 1969 INL conducted a thorough evaluation of the number of regular badges and number of temporary badges by area and by occupation (operations, trades, etc...) (SRDB# 143334 p.28)*
- *Recommendation was to issue a single dosimeter badge that employees could wear in all areas instead of getting a new temporary badge for each area.*
- *To implement, Dosimetry services had to get concurrence across multiple organizations including security.*



Review of INL Dosimetry Procedures

- Implemented in March 1970.
- ANC and AEC personnel who worked in TRA, CPP, TSF, and PBF could wear their dosimeter that was issued in another facility into CPP

DOSIMETRY BRANCH CHANGES

3-58	Discontinued the Self Service Badge System. Combined the Security Pass and Film for one Badge.
3-58	NRF Area - Operated By Westinghouse started using the Dosimetry Branch Badge and Record Keeping System. (Personnel having active badges in 1959 had their radiation exposure updated and the total for the prior years was put in the year 1958)
2-25-59	ANP Area - Operated by General Electric (KAPL) Evendale, Ohio, started using the complete badge and record keeping system.
12-66	Persons expected to receive less than .5R per year were transferred to TL disc.
3-70	The Area Exchange Badge was discontinued as a Security Device, personnel entering a Security Area had to show both the Security Pass and the Dosimeter Badge.
3-70	ANC and ID Personnel were issued one Security/Dosimeter Badge that could be worn in the ANC Areas. (TRA, CPP, TSF, PBF)
9-1-73	ALLIED - CPP Area - Person on monthly exchange were transferred to TL Disc System.
2-1-74	ALLIED - CPP Area - Persons on monthly exchange were transferred to ATLAS system.
12-1-74	ALLIED - CPP Area - Persons on monthly exchange were transferred to TL Chips.
12-74	The Dosimetry Badge System was returned to one Badge one Area.

SRDB 8436



Review of INL Dosimetry Procedures

- Change in methodology was verified through review of Dosimetry Correspondence files.
- Ms. Stanger wrote dozens of these memos per month.
 - CFA individual used three temporary dosimeters (2 at CPP and 1 at TRA) instead of permanent dosimeter.



IDAHO NUCLEAR CORPORATION

INTEROFFICE CORRESPONDENCE

August 25, 1970

Temporary Dosimetry Badge Use
MS-19-70

[REDACTED]
CFA 688

The purpose of the new badge procedure which permits access to any INC controlled area was initiated to reduce cost by eliminating the number of temporary film badge issuances.

You entered CPP on temporary film July 7th and July 22nd, and the TRA on temporary film July 31st.

Please remember to carry your permanent dosimetry badge with you when you go from area to area.

Your compliance with this procedure will be appreciated.

MJS:mab

[REDACTED]
M. J. Stanger

cc: File ←

SRDB 125888



Review of INL Dosimetry Procedures

- Memos are consistent with worker interviews (60+) that indicated a dosimeter / film badge was required for entry into radiological areas including CPP.
- Memos are consistent with other procedures that indicated a dosimeter / film badge was required for entry into radiological areas.

SRDB 125961



Division of Compensation Analysis and Support

Review of INL Dosimetry Procedures

- However, procedures indicate that for a nearly 5 year time period in the early 1970s, a dosimeter issued from another area was allowed to be worn at CPP.
- Note that this also corresponds with a general decrease in the radiological control practices that we observed at CPP that lead to the recommendation to add an SEC.
- Recommend a revised SEC Class definition

SRDB 125961



Revised SEC Class Definition

- *All employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Idaho National Laboratory (INL) in Scoville, Idaho, and were monitored for external radiation at the Idaho Chemical Processing Plant (CPP) (e.g., at least one film badge or TLD dosimeter from CPP) between January 1, 1963 and February 28, 1970 or who were monitored for external radiation at INL (e.g., at least one film badge or TLD dosimeter) between March 1, 1970 and December 31, 1974 for a number of work days aggregating at least 250 work days, occurring either solely under this employment, or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.*

