MOLYCORP, Inc.

A **UNOCAL** 76 COMPANY

Washington, PA Facility

Decommissioning Plan,

Part 1 Revision

June 30, 1999

RADIOLOGICAL SERVICES, INC.

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DECOMMISSIONING PLAN FOR MOLYCORP, INC.
WASHINGTON, PENNSYLVANIA

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1.0 GENERAL INFORMATION

Molycorp submitted the "Decommissioning Plan for the Washington, PA, Facility" (Decommissioning Plan) to the NRC in July 1995. In a letter dated June 1, 1999, (John C. Daniels, Molycorp Project Manager, to John W.N. Hickey, NRC Branch Chief) Molycorp informed the NRC that the Decommissioning Plan would be revised and re-submitted in two parts. This plan (hereinafter referred to as the Decommissioning Plan, Part 1 Revision) contains Part 1 of said two part revision and describes the activities required to remediate the site to unrestricted use levels in accordance with the SDMP Action Plan (57 FR 13389). The soil, slag, or other material exceeding the SDMP Action Plan criteria will be transported to an NRC approved location for final disposition. Since the original plan was submitted before August 20, 1998, and met the intent of the SDMP Action Plan as it pertains to unrestricted use criteria, this Part 1 Revision is being submitted per the Grandfathering provision in 10 CFR 20. 1401(3).

Part 2 of the Decommissioning Plan revision (to be submitted by April 16, 2000) will provide for the disposition of the material that exceeds the SDMP Action Plan criteria at an NRC approved location under the new regulations in 10 CFR 20 Subpart E. The objective of the Part 2 revision will be to designate an onsite impoundment at the Washington, PA, site as an NRC approved location for the final disposition of the material.

This Decommissioning Plan Part 1Revision sets forth the activities required to remediate soil, slag, and structures to meet SDMP Action Plan unrestricted use criteria. This plan also describes the programs and actions required to ensure that the activities are completed in a manner that maintains compliance with 10 CFR Parts 19, 20, and 40 and protects the public, environment, and workers.

This Decommissioning Plan Part 1 Revision is submitted in accordance with the guidance provided in the NRC Regulatory Guide 3.65, "Standard Format and Content of Decommissioning Plans for Licensees under 10 CFR Parts 30, 40 and 70." This Decommissioning Plan Part 1 Revision, in conjunction with the Decommissioning Plan Part 2 revision (to be submitted by April 16, 1999) supersedes the July 1995 Decommissioning Plan in its entirety.

1.1 PURPOSE

The purpose of the Decommissioning Plan Part 1 Revision is to present a description of the planned decommissioning activities pertaining to the excavation and transport of material exceeding the unrestricted use criteria, and the methods to be used to protect workers, the public, and the environment. This description includes the structure of the safety organization and the responsibilities of members of that organization.

1.2 LICENSE INFORMATION

Molycorp, Inc.'s Washington, Pennsylvania facility produced a ferrocolumbium alloy from Brazilian ore (pyrochlore) between 1964 and 1970. While the use of pyrochlore was commonplace by that time, this particular ore contained thorium, and slight traces of uranium, as an accessory metal. Note that the majority of the plan discusses the remediation of thorium contamination since it is the major isotope of concern. However, the small uranium contribution will be fully considered, through the use of the unity rule, during the demonstration of compliance with the SDMP Action Plan. The thorium was in concentrations that required Molycorp, Inc. to acquire a Source Materials License (December 19, 1963). The current Source Materials License is SMB-1393 (Docket 4008778). The operation resulted in the production of a thorium-bearing slag, some of which was used as fill material over portions of the site.

Currently, much of the slag produced from this operation is relocated in a stabilized, soil capped, pile on the southern portion of the site. There is also a smaller pile in the northern portion of the site. Ferrocolumbium slag is also mixed with soils at various locations on the site.

The slag material does not represent a threat to the public health and safety or to the environment. Additionally, while low concentrations of thorium are present in the slag mixed with site soils, there is no evidence that any of the thorium is migrating off the site.

1.3 FACILITY DESCRIPTION

The Molycorp, Inc. Washington Facility is situated on the outskirts of the City of Washington, PA at 300 Caldwell Avenue in Canton Township. The active site consists of approximately 20 acres that are fenced. The main process buildings are located on the north side of Caldwell Avenue, while employee vehicle parking, equipment and miscellaneous storage areas are located on the south side.

Molybdenum oxide manufacturing was begun in the 1920s, but processing of this material was idled in 1991. The plant also produced ferrocolumbium, as well as other ferroalloys, e.g., molybdenum. Currently, the site is in an extended standby mode with a small active area leased to a vendor. Purchasing and reselling alloys, maintenance and decommissioning are the principal current site activities. See Figure 1-1 for a site map of the facility today.


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2.0 DESCRIPTION OF PLANNED DECOMMISSIONING ACTIVITIES

2.1 DECOMMISSIONING OBJECTIVES, ACTIVITIES, TASKS AND SCHEDULES

2.1.1 Decommissioning Objectives

The decommissioning objectives for this Decommissioning Plan Part 1 revision are:

- To identify the location, depth, and thickness of areas containing greater than 10 pCi/g total thorium using the gamma-log data from the site characterization report. These areas are summarized in Table 2-1 and graphically displayed in Figures 2-1 through 2-X,
- To excavate all soil and slag containing average contamination levels in excess of the SDMP Action Plan unrestricted use criteria,
- To transport the material containing average contamination levels in excess of the SDMP Action Plan unrestricted use criteria to a NRC approved location.

The SDMP Action Plan unrestricted use criteria to be applied at the Washington site are listed below. The averaging methods are in accordance with NUREG/CR-5849 and other NRC guidance documents as referenced.

Unrestricted Use Limits for Soil and Slag

- 10 pCi/g average Total Thorium (Th-232 + Th-228)
- 10 pCi/g average Uranium (U-238 + U-234, assuming all daughters in equilibrium)
- Average exposure rate of 10 uR/hr, above background, at 1 m from the ground surface. No discrete location will exceed 20 uR/hr above background at 1 m.
- The average limit for soil concentrations and exposure rates will be met in each 100 m^2 grid area.
- Elevated areas of soil contamination that are less than 100 m^2 in size are acceptable if they meet the $(100/A)^{1/2}$ criteria from NUREG/CR-5849, and the weighted average in the 100 m^2 grid containing the elevated area does not exceed the average limit.
- Subsurface soil and slag will be surveyed and averaged to demonstrate compliance with the unrestricted use limits using the NRC guidance contained in the February 13, 1997, letter from John T. Buckley, NRC, to Howard A. Pulsifer, AAR Corporation.

Unrestricted Use Limits for Building and Structure Surfaces

- Average and maximum Direct (fixed + removable) surface contamination limits, and removable surface contamination limits as specified in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," Policy and Guidance Directive FC 83-23.

- Average exposure rate of 5 uR/hr above background, at 1 m from building surfaces, over 10 m^2 of contiguous surface area. No discrete location will exceed 10 uR/hr above background, at 1 m.

2.1.2 Decommissioning Tasks

The decommissioning tasks include the excavation of slag material, slag/soil, and other material with average concentrations of total thorium greater than or equal to the 10 pCi/g and the transport of this material to an NRC approved location. Although significant levels of surface contamination of buildings, or other structures are not expected, any such material exceeding the surface contamination criteria will also be transported to a NRC approved location.

Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-014-94	1.5	157.36	15.5	1.87
SB-019-94	3.0	12.62	1.5	4.97
SB-022-94	1.5	20.83	1.0	3.89
SB-023-94	3.5	13.51	4.5	4.79
SB-025-94	0.5	78.76	6.5	3.41
SB-026-94	0.5	19.89	5.0	6.14
SB-027-94	0.5	28.26	5.0	2.10
SB-028-94	0.5	30.90	9.5	2.09
SB-029-94	2.0	18.82	7.0	2.41
SB-031-94	0.5	17.80	1.5	5.69
SB-032-94	0.5	33.96	10.5	2.18
SB-033-94	0.5	96.68	11.0	1.42
SB-034-94	2.0	61.45	9.5	1.94
SB-035-94	3.0	27.76	11.0	4.36
SB-036-94	0.5	161.54	10.5	2.06
SB-040-94	0.0	88.13	2.5	4.30
SB-042-94	0.5	42.33	3.0	0.94
SB-043-94	0.0	379.33	17.5	2.10
SB-044-94	0.0	277.99	8.5	1.27
SB-045-94	3.5	86.95	11.0	3.89
SB-050-94	0.0	532.57	15.0	3.29
SB-051-94	3.0	64.84	4.0	4.83
SB-053 Relog-94	0.5	29.13	10.0	4.54
SB-053-94	0.5	28.34	10.0	4.82
SB-055-94	2.5	65.62	3.0	3.70
SB-056-94	0.0	685.59	17.0	2.87
SB-056a-94	2.5	63.20	3.0	4.67
SB-056b-94	2.5	23.61	2.5	6.16
SB-056c-94	0.0	57.94	7.0	6.86
SB-056c-94 2nd trial	0.0	54.70	5.0	6.65
SB-057-94	4.5	64.40	4.0	8.02
SB-058-94	1.5	58.56	4.5	2.45
SB-059-94	2.0	90.04	2.0	4.30
SB-060-94	2.0	31.76	1.0	3.09
SB-064-94	1.5	10.61	0.5	4.75
SB-065-94	2.0	963.77	6.5	2.89
SB-066-94	5.5	80.65	1.5	3.18
SB-067-94	6.0	30.63	5.0	5.11
SB-068-94	1.0	1218.82	11.5	7.04
SB-070-94	0.0	15.34	7.0	2.55
SB-071-94	0.0	47.50	5.5	4.66
SB-072-94	1.0	338.76	4.5	5.08
SB-073-94	2.0	78.65	5.5	3.57

Table 2-1
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Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-074-94	0.0	37.74	5.0	1.71
SB-075-94	0.0	77.59	3.0	4.41
SB-076-94	1.5	24.68	1.5	3.45
SB-078-94	0.0	506.07	5.5	1.00
SB-079-94	0.0	41.18	0.5	1.34
SB-080-94	0.0	119.14	1.0	1.40
SB-081-94	0.0	35.89	0.5	2.66
SB-082-94	3.5	121.43	3.0	2.62
SB-085-94	0.0	19.44	2.0	1.97
SB-085relog-94	0.0	36.33	1.5	1.66
SB-086-94	0.0	15.68	4.5	4.35
SB-087-94	0.0	73.49	16.0	3.18
SB-088-94	0.0	427.08	17.5	2.64
SB-089-94	1.5	47.19	2.0	3.61
SB-090-94	0.5	63.95	5.0	6.08
SB-091-94	3.0	17.87	1.5	6.53
SB-092-94	0.0	43.94	2.0	4.56
SB-093-94	0.0	75.01	5.0	3.64
SB-094-94	0.5	20.27	5.5	5.26
SB-095-94	1.5	55.87	1.5	5.07
SB-096-94	1.5	46.66	5.0	5.24
SB-097-94	0.0	256.44	3.0	1.83
SB-098-94	1.5	20.40	4.0	3.91
SB-101-94	0.0	43.72	5.0	4.97
SB-102-94	0.0	38.06	4.5	5.27
SB-103-94	1.0	22.42	4.0	5.22
SB-104-94	1.5	28.50	4.5	4.41
SB-105-94	0.5	39.86	6.5	1.26
SB-106-94	0.0	69.97	6.0	7.35
SB-107-94	0.5	85.87	4.0	3.24
SB-108-94	1.0	19.36	5.5	3.09
SB-109-94	0.0	85.52	6.5	5.14
SB-110-94	0.0	98.41	6.0	2.18
SB-111-94	0.5	34.51	3.0	3.92
SB-112-94	3.5	26.15	2.5	1.82
SB-114-94	0.0	110.99	2.5	1.19
SB-116-94	0.0	225.66	6.0	2.52
SB-117-94	1.0	177.63	5.5	3.80
SB-118-94	1.5	89.13	4.5	2.09
SB-119-94	1.0	159.68	7.5	1.90
SB-120-94	1.0	270.43	7.0	4.58
SB-121-94	1.5	167.07	6.0	4.79
SB-122-94	1.0	152.37	7.0	2.22
SB-123-94	1.0	164.38	7.0	5.11

Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-124-94	0.5	37.83	6.5	5.77
SB-125-94	1.5	26.88	5.0	6.20
SB-126-94	0.5	79.53	5.0	6.87
SB-127-94	3.0	10.42	0.5	3.98
SB-130-94	0.0	184.88	2.0	0.0
SB-131-94	2.0	112.63	2.5	2.44
SB-132-94	0.5	16.35	7.0	4.66
SB-133-94	0.0	179.56	6.0	1.50
SB-134-94	0.0	628.80	16.5	9.50
SB-136-94	0.5	64.31	6.5	5.83
SB-137-94	0.5	460.19	7.5	2.80
SB-139-94	0.0	2070.05	8.5	2.08
SB-140 relog-94	1.5	167.30	2.5	3.18
SB-140-94	0.0	57.45	2.0	2.26
SB-142-94	0.5	40.02	7.0	5.69
SB-147-94	0.0	35.01	1.0	9.57
SB-148-94	4.0	28.31	1.5	2.30
SB-149-94	1.0	21.32	1.5	4.42
SB-150-94	0.0	45.46	3.5	2.90
SB-151-94	0.0	51.78	7.5	5.18
SB-153-94	0.0	77.26	8.0	1.93
SB-154-94	0.0	975.48	11.5	7.75
SB-156-94	1.5	101.49	6.0	4.06
SB-157-94	0.0	28.20	1.0	0.90
SB-159-94	0.0	87.39	6.5	3.70
SB-161-94	0.0	51.98	11.5	3.73
SB-164-94	6.0	67.76	10.5	2.24
SB-166-94	0.5	24.31	3.0	3.92
SB-169-94	0.0	33.85	3.0	1.58
SB-170-94	0.0	31.08	3.5	2.49
SB-172-94	1.0	31.18	3.0	5.32
SB-173-94	1.5	65.06	2.0	3.31
SB-175-94	1.5	55.63	5.5	1.94
SB-177-94	0.0	49.10	3.0	5.18
SB-178-94	0.0	52.97	8.5	4.99
SB-181-94	0.0	50.55	8.5	4.72
SB-182-94	2.5	60.70	4.5	2.30
SB-183-94	4.0	14.02	2.5	4.70
SB-184-94	2.5	48.65	4.5	3.42
SB-185-94	2.0	21.32	4.5	2.98
SB-187-94	0.0	34.58	5.5	6.20
SB-188-94	7.5	19.30	1.5	3.95
SB-189-94	6.5	20.28	4.5	5.93
SB-190-94	6.5	26.00	6.0	2.93

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Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-192-94	6.0	19.12	6.0	2.54
SB-193-94	5.0	27.28	6.0	3.95
SB-194-94	4.5	21.74	4.5	2.27
SB-195-94	4.5	17.40	5.0	3.69
SB-196-94	0.5	34.25	11.0	5.72
SB-197-94	0.5	33.29	11.5	3.27
SB-198-94	3.0	25.65	7.5	4.11
SB-199-94	0.5	65.39	9.0	2.99
SB-200-94	5.0	16.64	3.0	3.49
SB-201-94	3.0	19.55	4.0	3.66
SB-202-94	3.0	15.12	3.0	2.29
SB-203-94	0.0	42.54	4.5	3.57
SB-204-94	2.0	165.87	14.0	4.23
SB-205-94	1.0	13.00	3.5	5.17
SB-206-94	0.5	26.75	7.0	4.84
SB-207-94	0.5	32.63	10.5	3.67
SB-208-94	0.0	49.46	9.5	1.54
SB-209-94	4.0	47.63	5.0	3.12
SB-211-94	3.0	12.12	1.0	4.08
SB-212-94	3.5	11.66	0.5	3.71
SB-213-94	3.0	33.46	7.5	4.07
SB-214-94	0.5	36.37	6.5	4.43
SB-215-94	9.5	101.50	2.0	2.32
SB-216-94	1.5	87.37	10.0	3.12
SB-217-94	0.0	63.52	12.0	2.79
SB-218-94	0.0	67.94	8.5	4.18
SB-219-94	1.5	91.41	9.0	3.91
SB-220-94	0.0	75.90	5.5	3.49
SB-222-94	8.5	12.80	0.5	3.66
SB-224-94	4.0	37.12	5.5	1.11
SB-225-94	1.5	84.02	8.0	3.16
SB-226-94	1.0	25.05	9.0	3.00
SB-227-94	1.5	284.77	10.5	3.97
SB-228-94	0.0	213.04	12.0	5.36
SB-230-94	1.0	19.16	9.0	3.55
SB-231-94	1.5	82.08	8.5	1.78
SB-232-94	0.0	43.15	9.5	2.89
SB-233-94	2.0	28.25	4.0	2.59
SB-234-94	0.0	46.52	9.0	2.92
SB-235-94	0.0	55.33	4.5	5.59
SB-236-94	0.0	163.30	12.5	4.27
SB-237-94	0.0	234.58	9.0	1.92
SB-238-94	0.0	161.29	17.0	5.22
SB-239-94	0.0	41.93	11.0	3.13

Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-240-94	0.0	53.87	4.5	0.0
SB-242-94	0.5	48.26	11.0	3.94
SB-243-94	2.0	21.99	7.5	3.29
SB-244-94	0.5	35.23	13.0	3.81
SB-245-94	0.0	78.53	9.0	2.57
SB-246-94	3.5	53.10	6.0	1.41
SB-247-94	4.0	36.70	2.5	4.93
SB-248-94	0.0	80.51	11.0	3.76
SB-249-94	0.0	351.25	12.0	5.93
SB-250-94	0.0	416.09	11.0	4.00
SB-251-94	0.5	36.04	11.0	3.65
SB-252-94	0.0	25.93	10.5	4.67
SB-253-94	0.0	360.13	8.5	1.83
SB-254-94	0.0	222.15	18.0	3.63
SB-255-94	0.0	225.58	9.5	3.61
SB-256-94	2.5	334.55	7.0	2.76
SB-257-94	0.0	74.94	5.5	5.22
SB-258-94	0.0	416.09	11.0	4.00
SB-259-94	0.0	335.85	7.5	5.45
SB-260-94	0.0	800.71	11.0	0.0
SB-263-94	1.5	118.99	6.0	1.77
SB-264-94	3.0	11.82	7.0	3.66
SB-265-94	0.0	1135.54	19.0	0.0
SB-266-94	0.0	96.75	9.0	9.77
SB-267-94	3.5	119.95	4.5	6.74
SB-267a-94	0.5	17.43	2.0	2.42
SB-268-94	0.0	140.60	8.0	1.05
SB-270-94	0.0	237.19	2.0	3.81
SB-271-94	0.0	373.29	8.5	1.34
SB-272-94	0.5	53.37	7.0	2.22
SB-273-94	0.0	552.60	3.5	1.96
SB-274-94	5.0	10.66	0.5	4.08
SB-275-94	8.5	87.16	2.5	3.98
SB-276-94	0.0	294.07	7.0	1.76
SB-278-94	0.0	102.26	10.0	3.57
SB-279-94	0.5	65.44	10.0	3.54
SB-280-94	0.0	96.00	12.0	3.50
SB-281-94	9.0	16.64	5.5	3.12
SB-282-94	2.5	219.07	7.5	3.54
SB-283-94	12.5	19.64	2.0	3.95
SB-284-94	3.5	56.64	1.5	4.50
SB-284a-94	3.5	67.32	2.0	1.35
SB-287-94	0.0	67.44	4.0	9.75
SB-288-94	3.5	295.44	5.0	4.07

Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

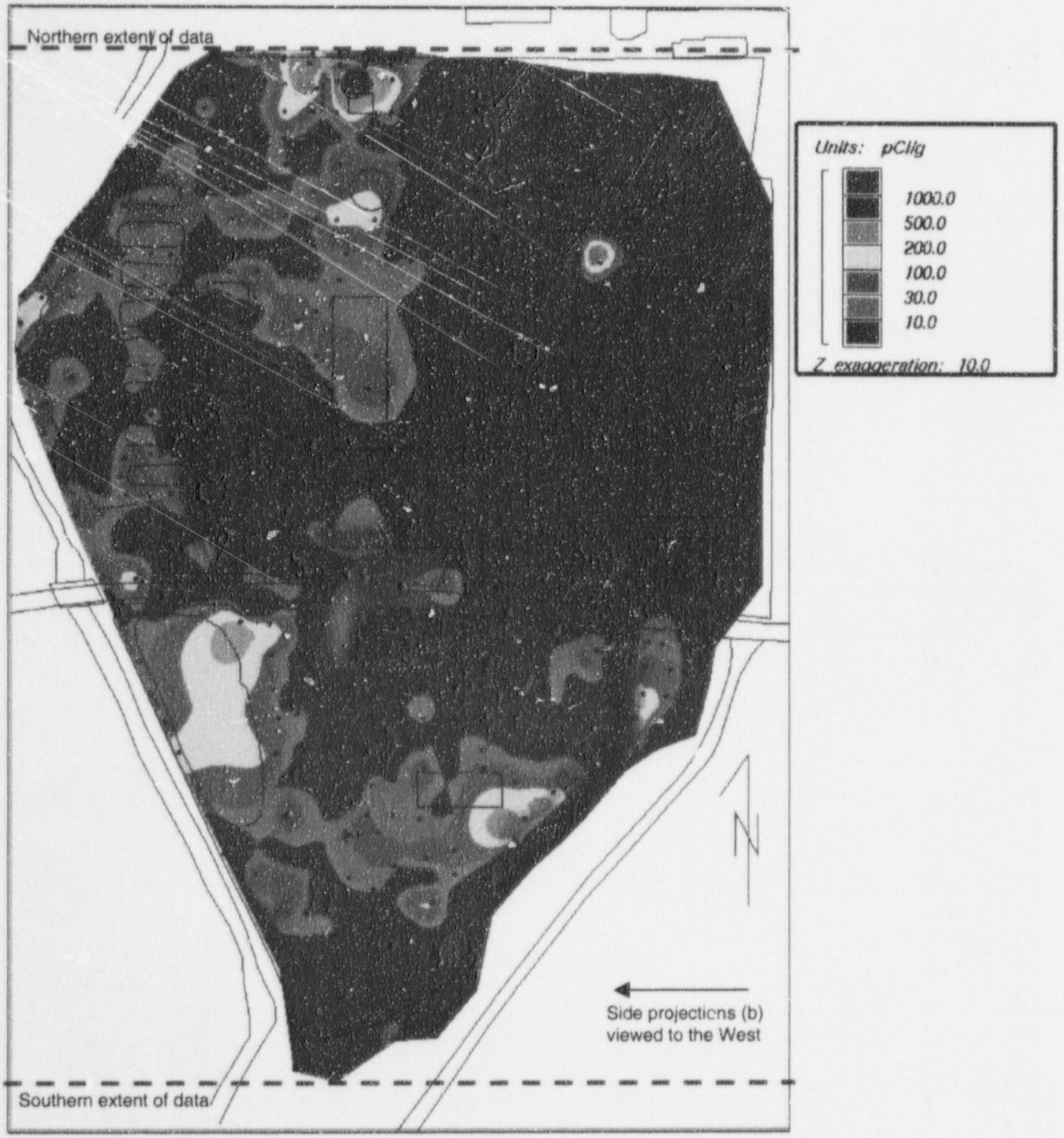
Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-289-94	0.0	361.78	9.0	0.0
SB-290-94	0.0	75.60	10.0	3.05
SB-291-94	0.0	192.61	14.0	3.27
SB-293-94	0.0	182.90	4.0	3.22
SB-294-94	1.0	24.51	1.0	2.95
SB-297-94	1.0	133.63	3.0	4.98
SB-301-94	4.0	11.52	1.0	5.06
SB-306-94	0.0	47.04	7.5	3.26
SB-307-94	0.5	49.79	7.5	1.30
SB-308-94	N/A	5.79	0.5	1.56
SB-309-94	5.0	17.82	1.0	2.36
SB-310-94	2.0	14.77	1.0	0.08
SB-311-94	4.5	96.09	6.0	4.85
SB-312-94	6.5	378.00	5.0	3.91
SB-313-94	4.5	103.48	8.5	4.78
SB-314-94	0.0	103.78	13.0	3.66
SB-315-94	2.5	133.16	14.0	2.46
SB-316-94	0.0	97.72	8.0	3.15
SB-318-94	0.0	30.45	8.0	4.82
SB-319-94	1.5	216.13	6.5	4.25
SB-320-94	0.0	11.89	0.5	4.23
SB-323-94	0.0	27.94	1.5	0
SB-324-94	0.0	247.26	4.5	1.79
SB-325-94	0.0	271.49	5.0	1.88
SB-326-94	0.0	36.91	2.5	1.97
SB-328-94	0.0	292.52	5.0	1.01
SB-330-94	0.5	26.14	5.0	1.35
SB-331-94	3.0	36.68	3.5	1.83
SB-332-94	3.5	11.63	0.5	1.41
SB-333-94	0.0	143.51	4.5	0
SB-334-94	2.0	46.21	2.5	5.29
SB-335-94	0.0	782.09	16.0	3.61
SB-336-94	0.0	547.88	10.5	1.61
SB-337-94	0.0	420.47	18.0	1.69
SB-338-94	0.0	692.30	14.5	6.50
SB-339-94	0.0	1036.09	9.0	6.35
SB-340-94	0.0	1331.60	16.0	3.27
SB-342-94	0.0	70.74	3.0	2.68
SB-343-94	0.5	134.45	5.0	8.01
SB-345-94	0.0	23.07	7.0	3.76
SB-346-94	2.0	23.87	7.0	3.71
SB-347-94	0.0	442.95	19.0	5.99
SB-350-94	0.0	108.39	6.0	3.04
SB-351-94	0.0	19.77	6.5	4.02

Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-352-94	0.0	580.42	6.0	1.63
SB-355-94	0.0	115.38	6.0	3.85
SB-356-94	0.5	67.36	4.5	4.34
SB-362-94	0.0	313.12	3.5	2.98
SB-363-94	0.0	83.22	1.0	1.78
SB-365-94	0.0	151.98	3.5	1.03
SB-366-94	0.0	126.38	5.5	4.88
SB-367-94	0.5	199.42	5.0	3.64
SB-368-94	2.5	48.20	3.0	4.03
SB-369-94	11.0	14.11	0.5	4.37
SB-370-94	0.0	33.93	7.0	4.93
SB-371-94	6.0	108.52	2.5	3.06
SB-372-94	0.0	195.29	9.0	8.35
SB-373-94	0.0	356.41	10.0	1.43
SB-374-94	2.0	29.68	2.0	4.71
SB-375-94	2.0	97.72	5.0	1.59
SB-376-94	0.0	71.85	9.0	5.71
SB-377-94	0.5	79.75	8.5	2.50
SB-378-94	0.0	73.18	3.5	4.47
SB-379-94	0.5	39.09	7.5	7.08
SB-380-94	0.0	214.07	8.5	1.83
SB-383-94	16.0	17.36	2.0	2.17
SB-385-94	0.0	65.62	5.5	2.97
SB-386-94	0.0	59.70	9.0	5.89
SB-387-94	0.0	154.00	10.0	2.42
SB-388-94	0.0	73.76	3.0	5.82
SB-389-94	0.0	19.76	7.0	5.99
SB-390-94	0.0	48.39	3.5	6.04
SB-391-94	1.0	14.11	6.0	4.54
SB-392-94	0.0	34.40	13.0	2.30
SB-414-94	1.5	14.73	1.0	2.50
SB-415-94	1.5	21.39	0.5	6.18
SB-416-94	1.0	84.39	6.0	2.62
SB-417-94	0.0	78.90	7.5	7.94
SB-418-94	0.0	35.50	2.5	1.44
SB-419-94	0.5	13.66	1.5	5.60
SB-420-94	0.5	10.62	0.5	2.21
SB-422-94	0.5	12.35	0.5	3.45
SB-424-94	0.0	225.55	3.0	2.21
SB-425-94	1.0	52.30	6.5	2.70
SB-427-94	0.5	10.16	0.5	3.44
SB-428-94	0.5	25.66	1.5	3.05
SB-429-94	0.0	83.70	2.0	1.00
SB-430-94	0.0	176.59	3.0	1.64

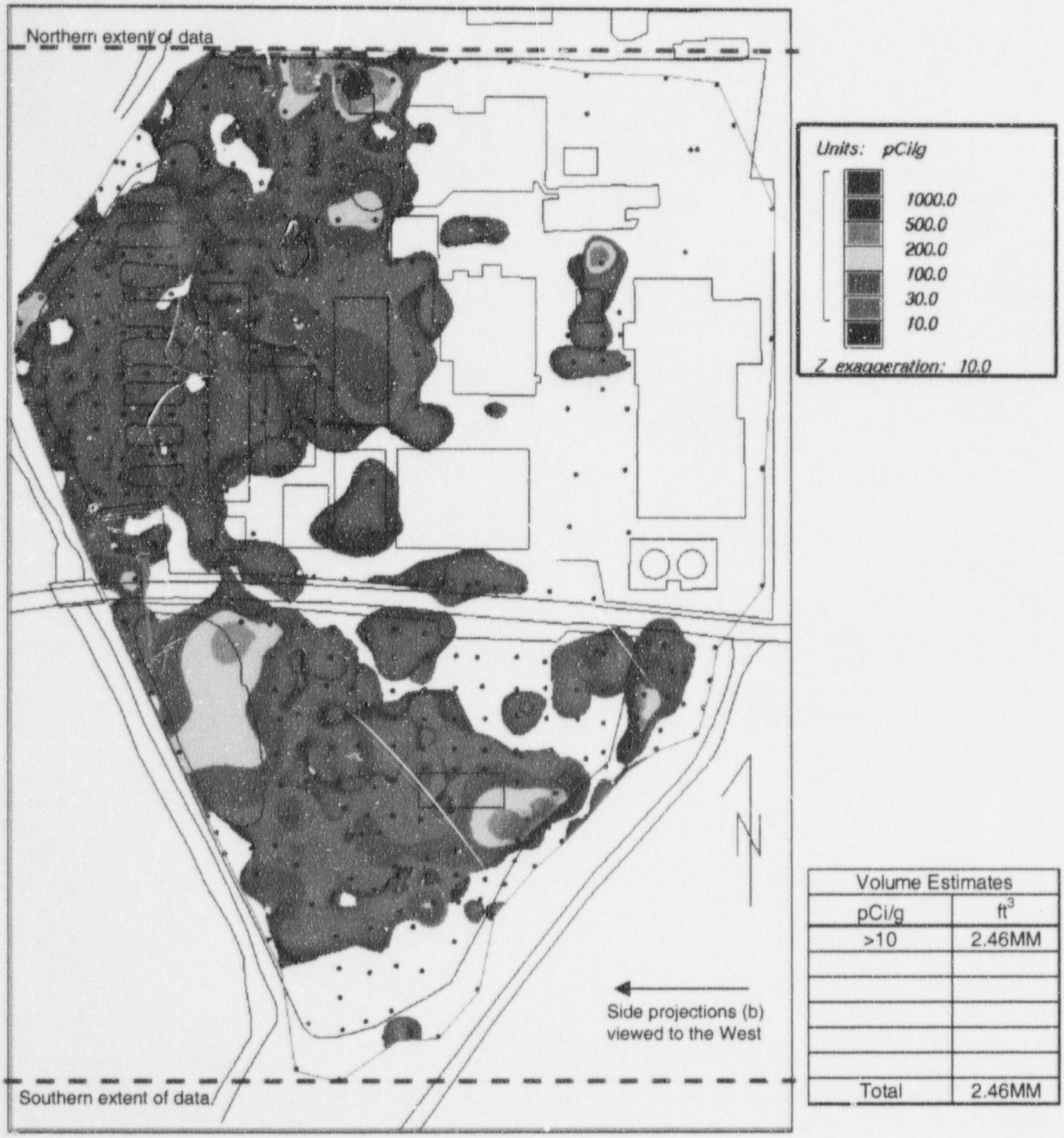
Table 2-1
POTENTIAL MATERIALS TO BE EXCAVATED

Soil Boring #	Clean Overburden Thickness (feet)	Maximum Total Thorium Concentration (pCi/g)	Thickness of Contaminated Zone (feet)	Remaining Total Thorium Concentration (pCi/g)
SB-431-94	0.0	192.09	2.0	2.11
SB-432-94	0.0	93.25	5.5	1.77
SB-437-94	0.0	125.38	3.0	1.96
SB-438-94	0.0	88.46	2.0	1.30
SB-439-94	0.0	28.00	1.0	1.44
SB-445-94	1.0	35.25	1.5	2.10



Plan view projection of all total thorium concentrations at surface.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

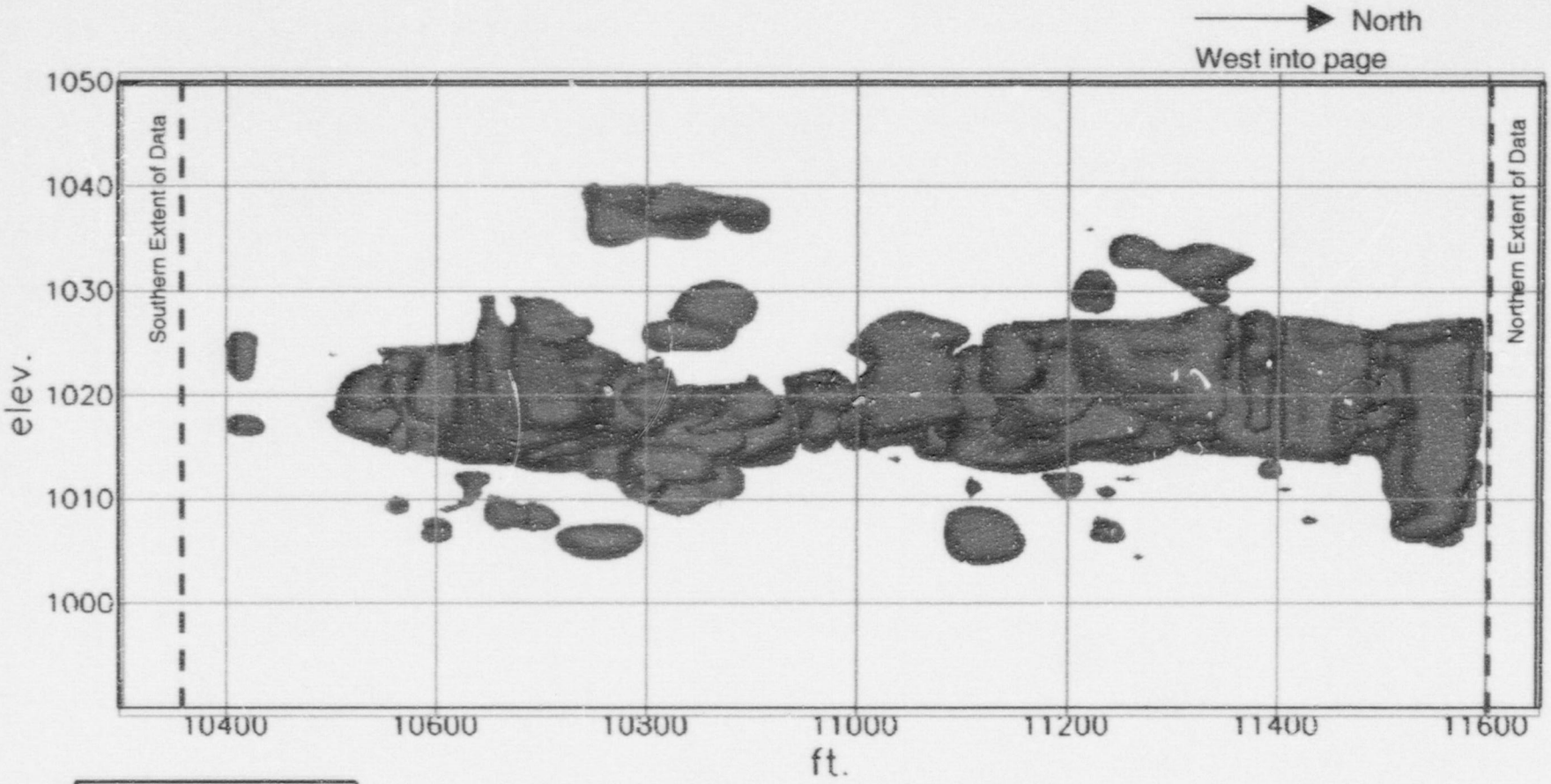
Figure 2-1 - Location of Total Thorium Concentration at Surface
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
>10	2.46MM
Total	2.46MM

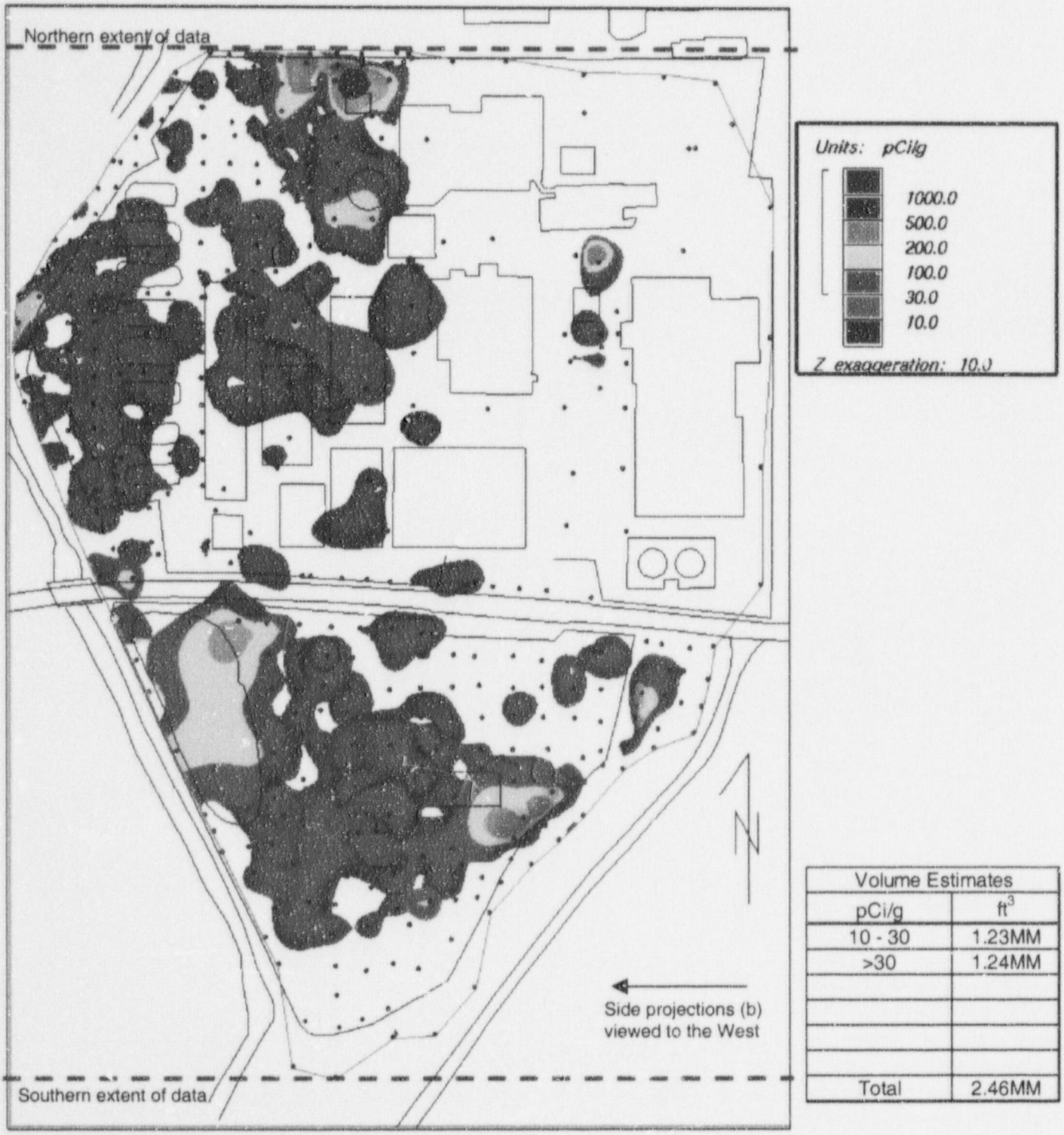
Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-2a - Location of Total Thorium Concentration Exceeding 10 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

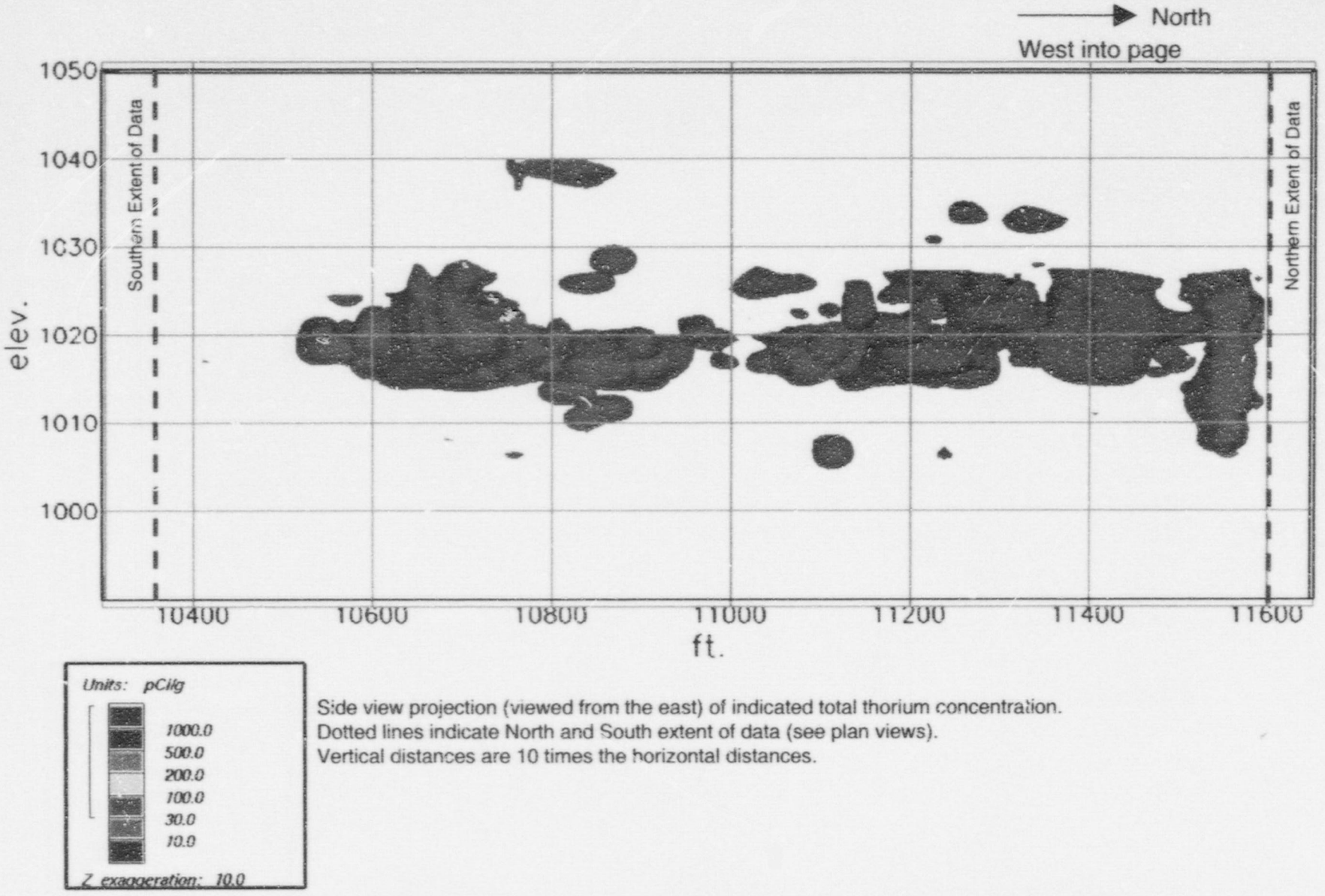
Figure 2-2b - Location of Total Thorium Concentration Exceeding 10 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
10 - 30	1.23MM
>30	1.24MM
Total	2.46MM

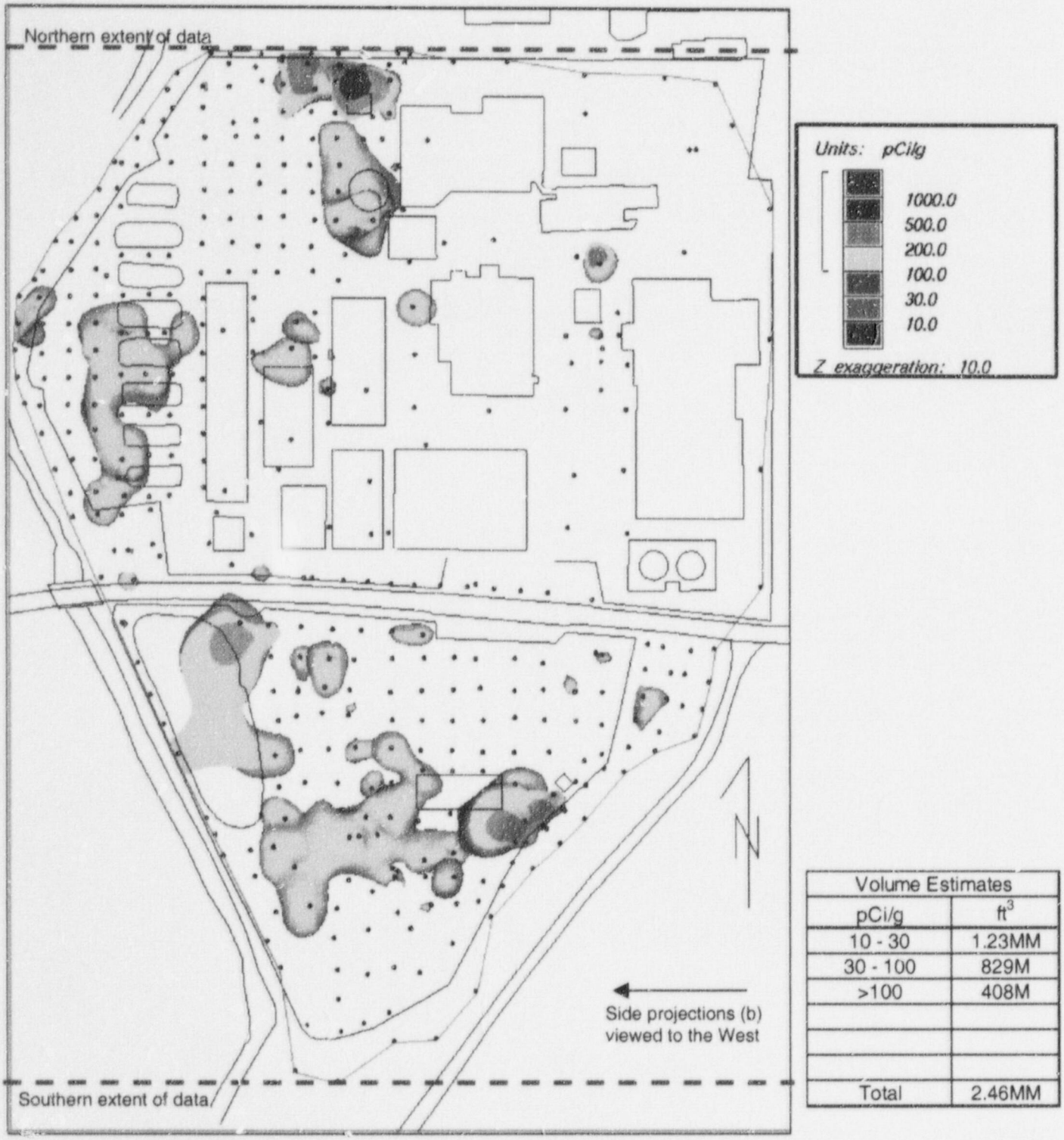
Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-3a - Location of Total Thorium Concentration Exceeding 30 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

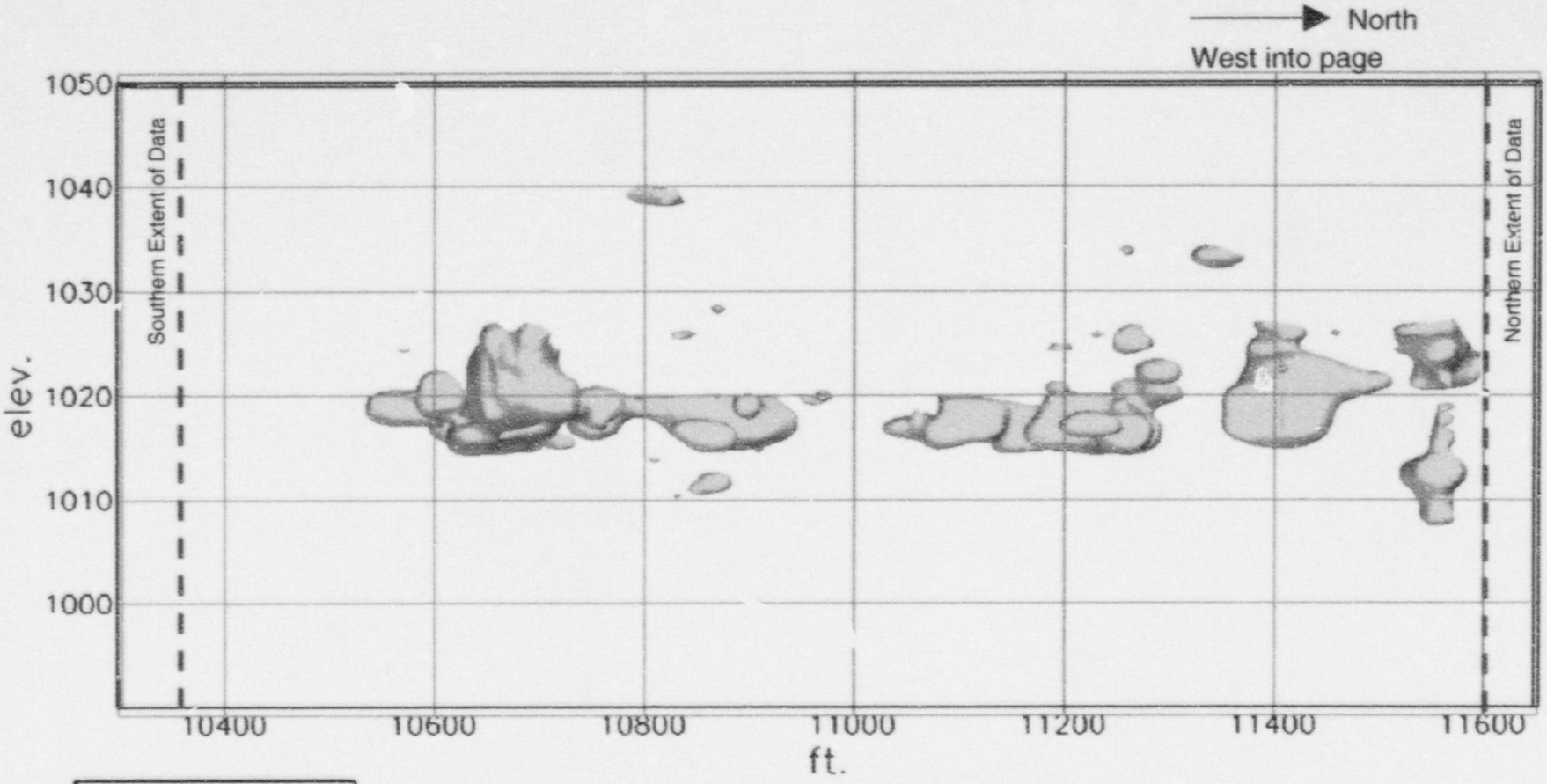
Figure 2-3b - Location of Total Thorium Concentration Exceeding 30 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
10 - 30	1.23MM
30 - 100	829M
>100	408M
Total	2.46MM

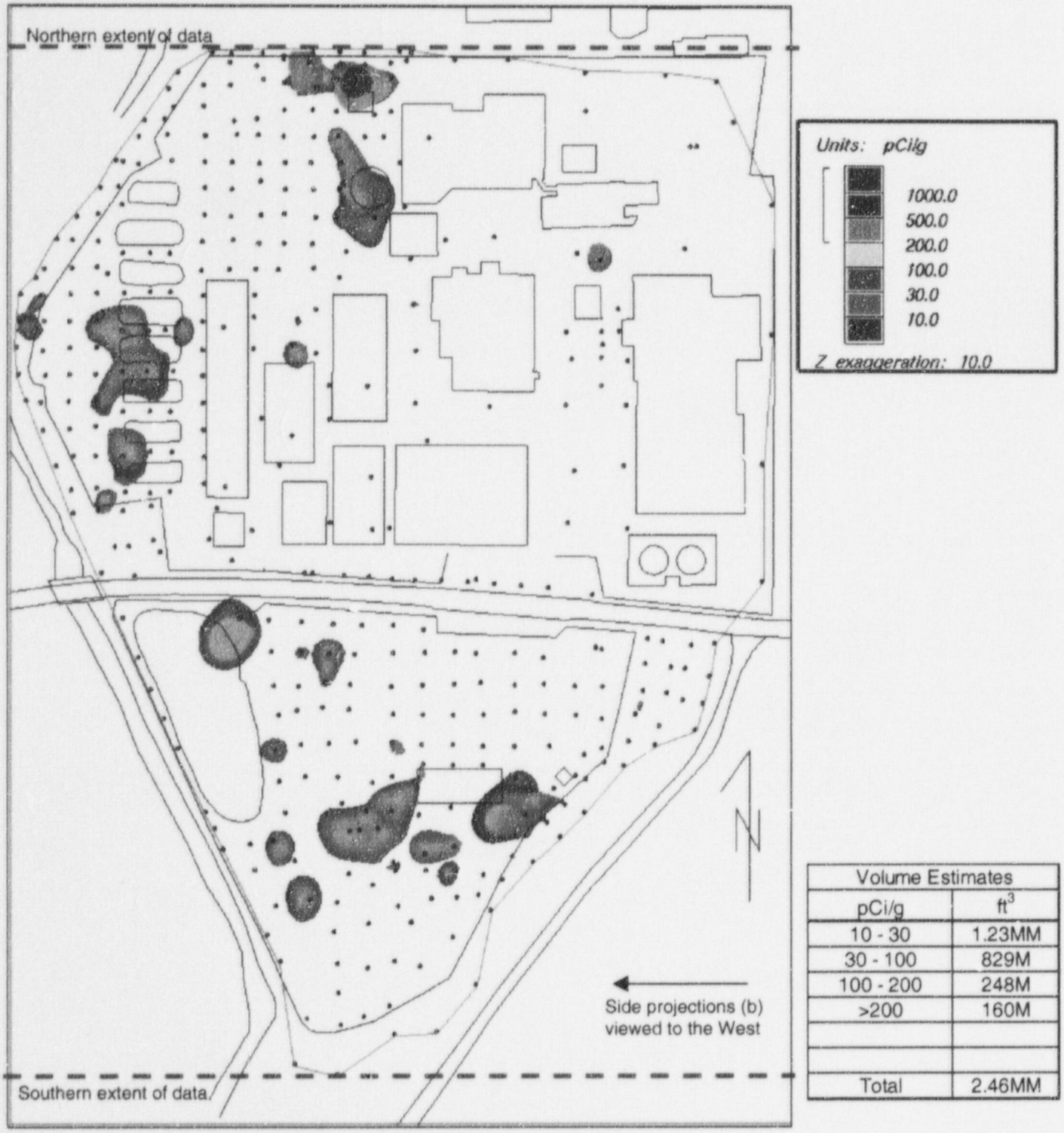
Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-4a - Location of Total Thorium Concentration Exceeding 100 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

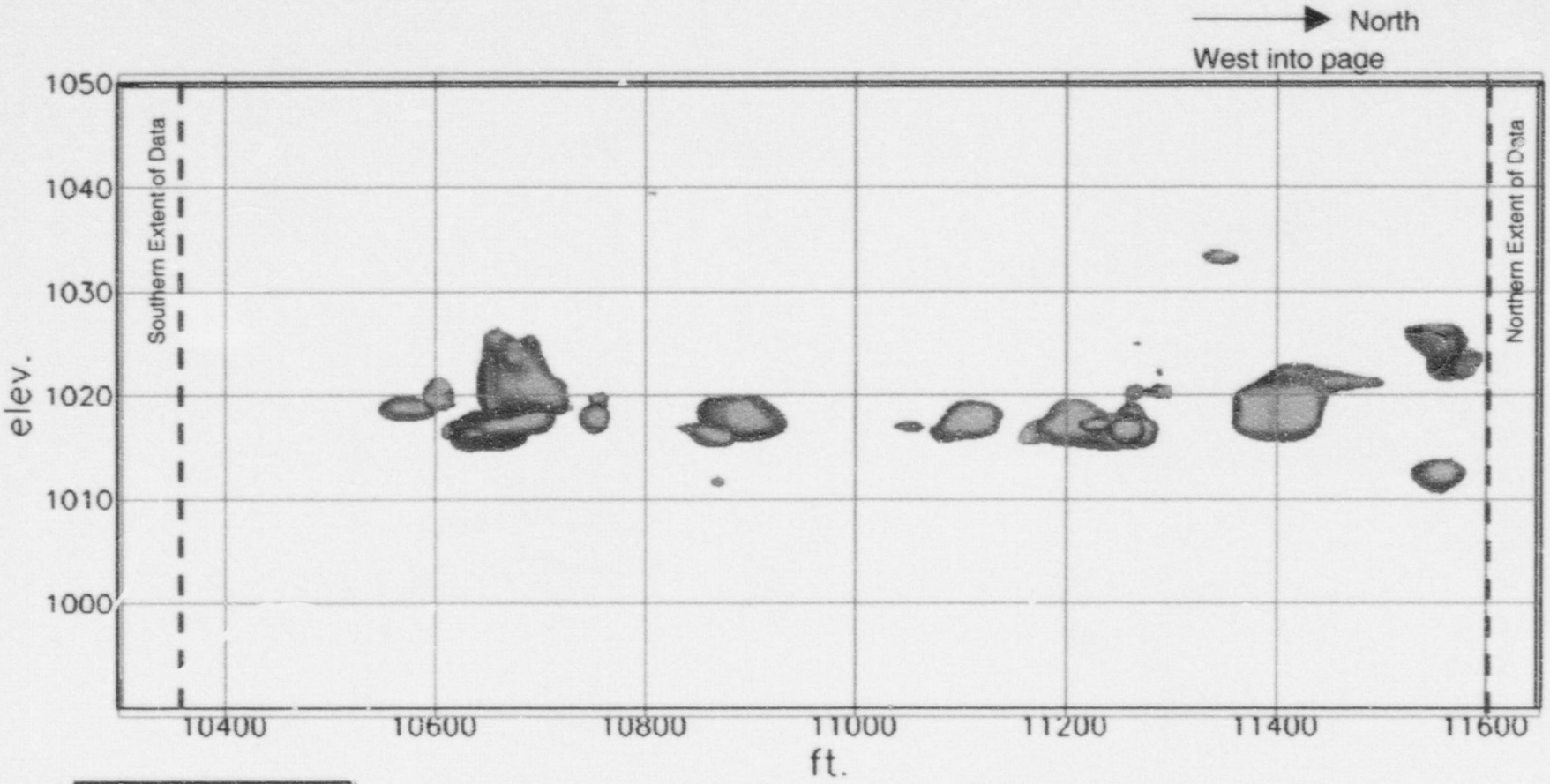
Figure 2-4b - Location of Total Thorium Concentration Exceeding 100 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
10 - 30	1.23MM
30 - 100	829M
100 - 200	248M
>200	160M
Total	2.46MM

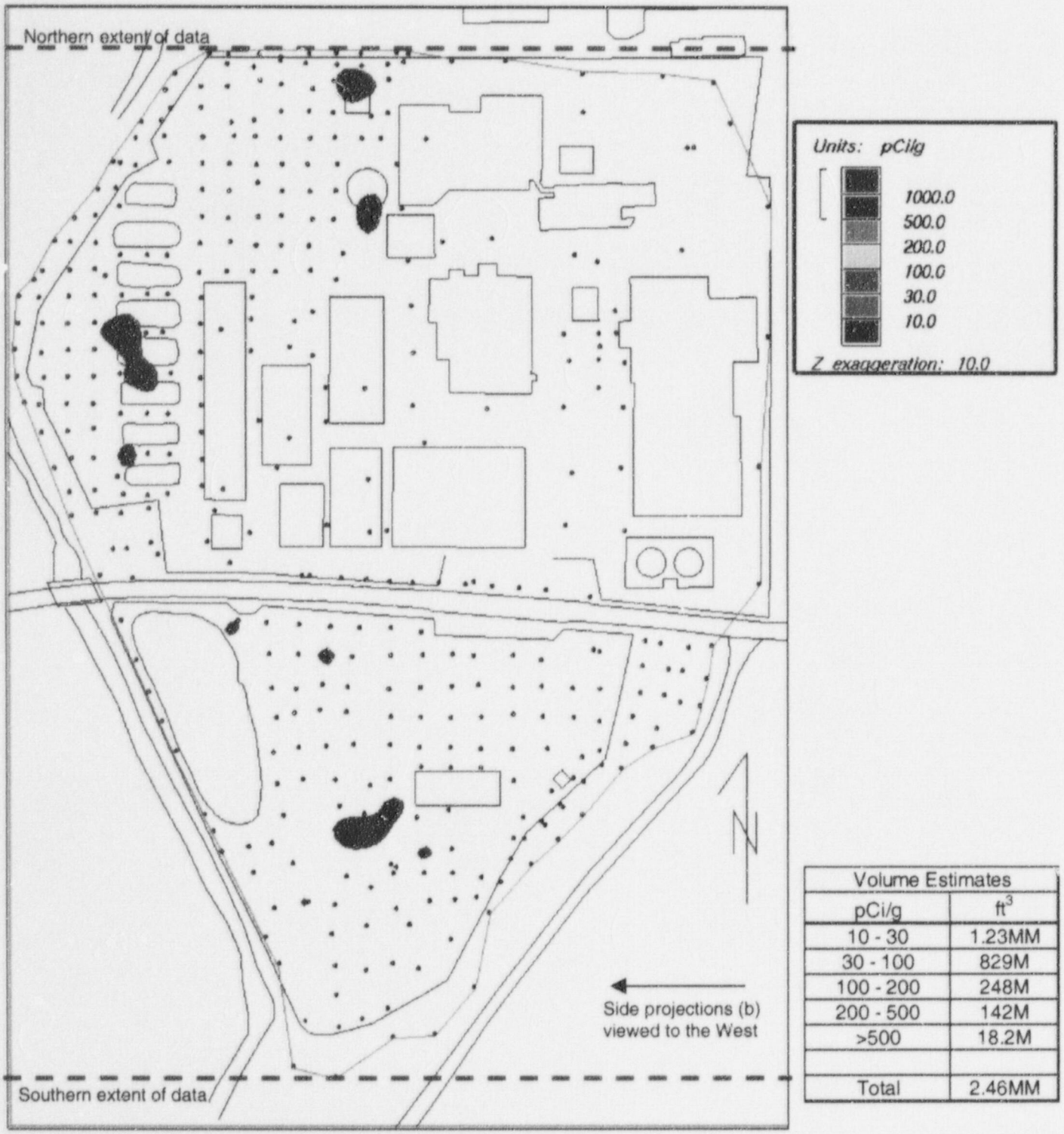
Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-5a - Location of Total Thorium Concentration Exceeding 200 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

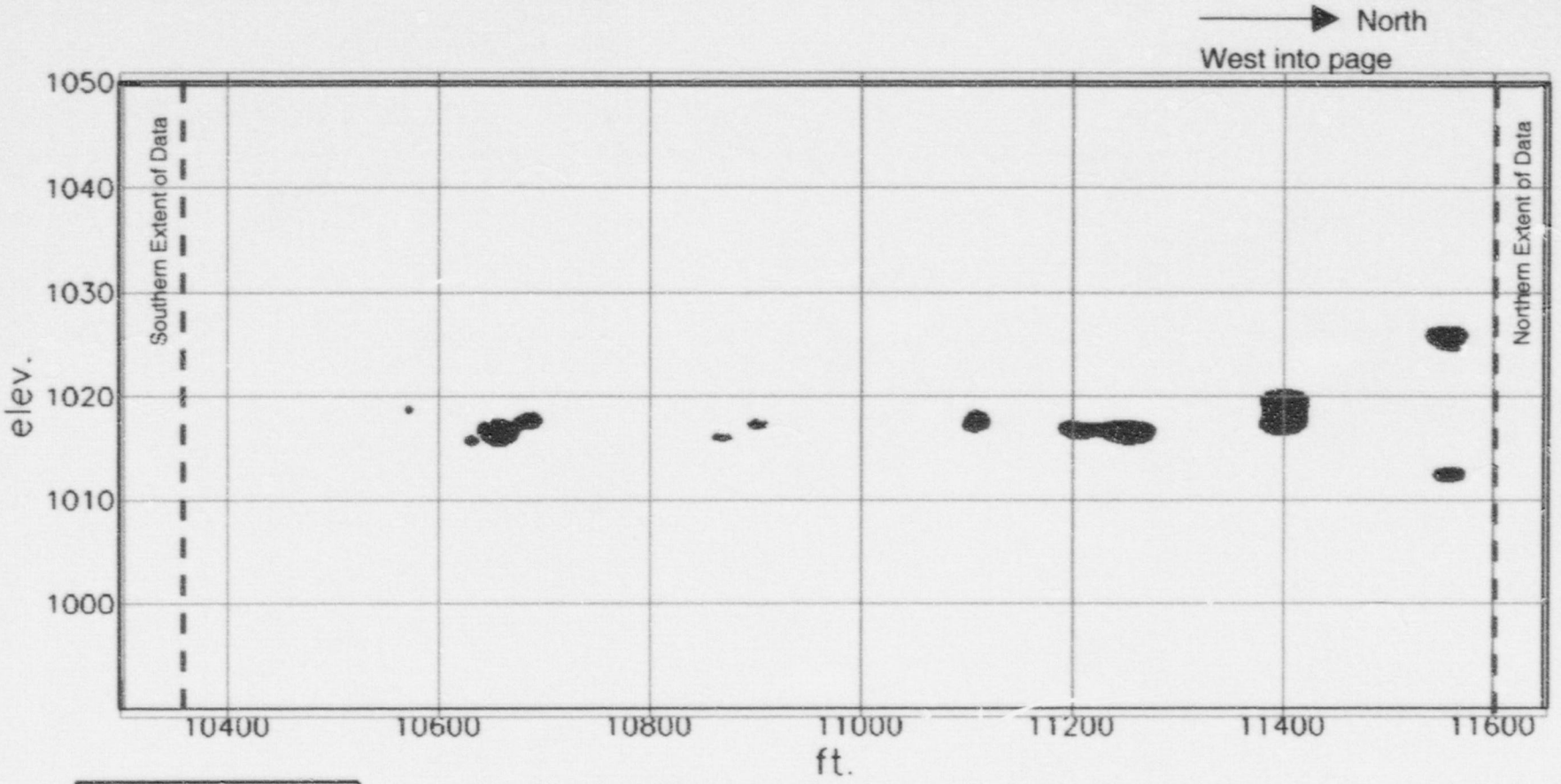
Figure 2-5b - Location of Total Thorium Concentration Exceeding 200 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
10 - 30	1.23MM
30 - 100	829M
100 - 200	248M
200 - 500	142M
>500	18.2M
Total	2.46MM

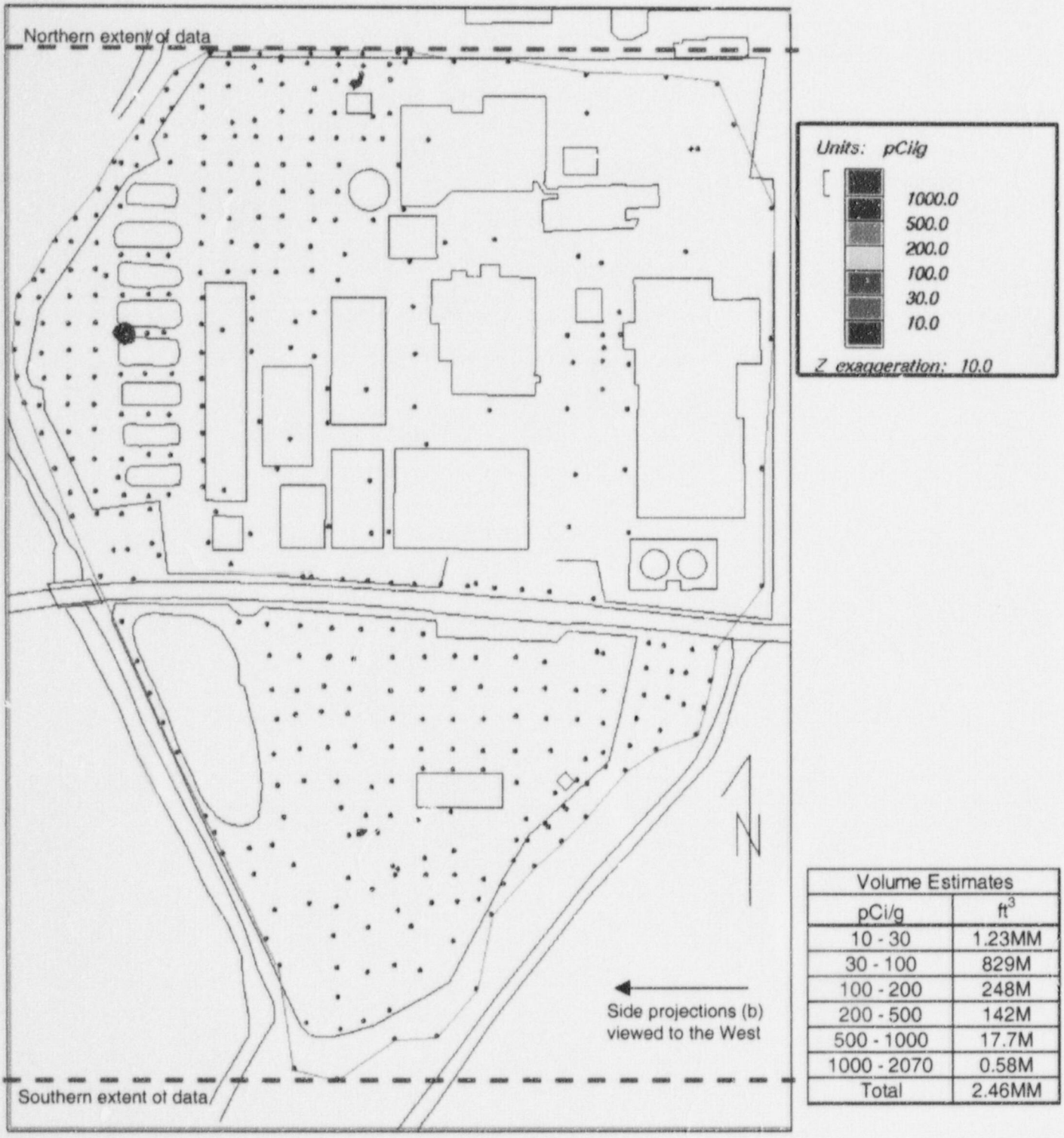
Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-6a - Location of Total Thorium Concentration Exceeding 500 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

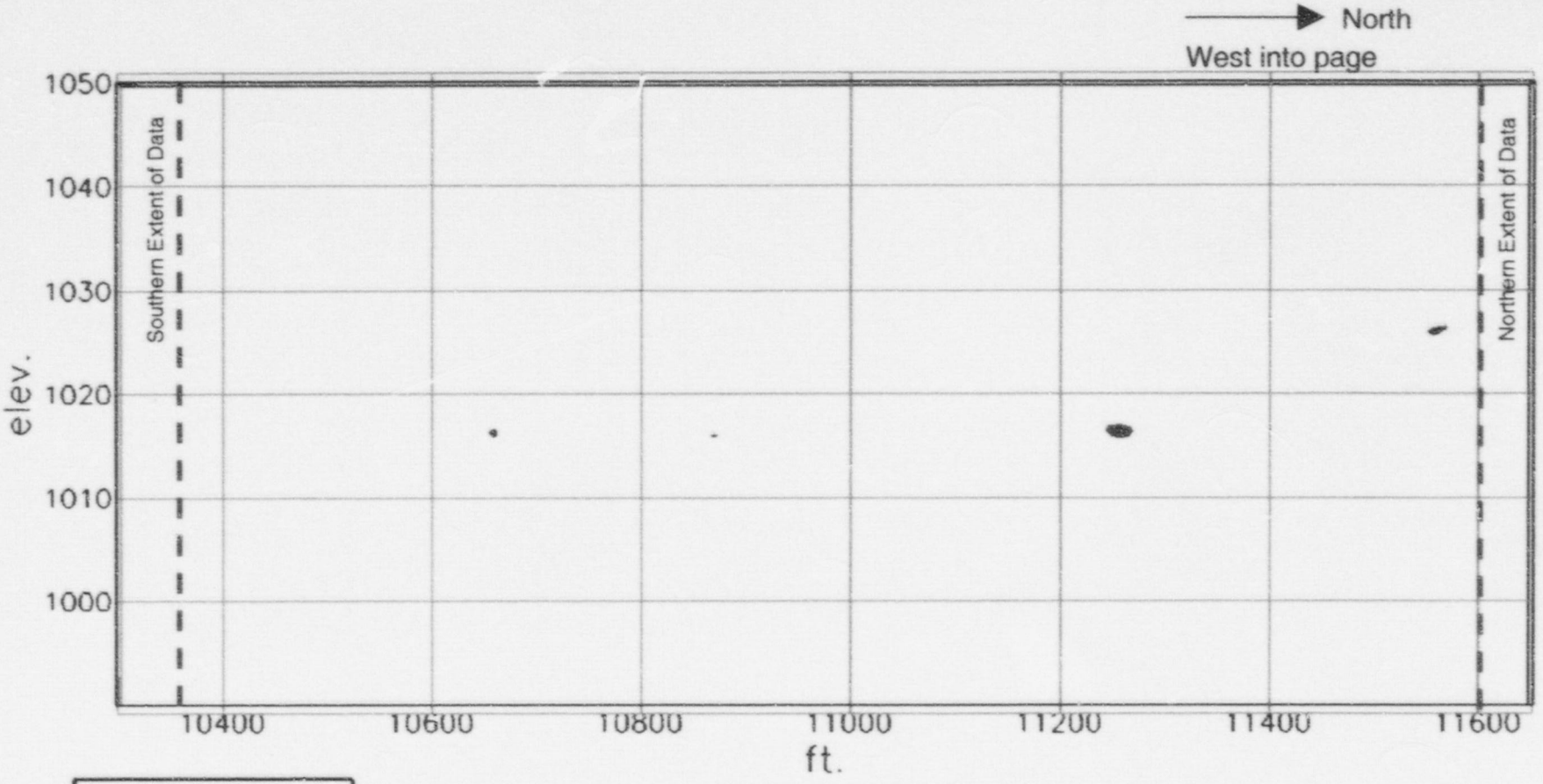
Figure 2-6b - Location of Total Thorium Concentration Exceeding 500 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility



Volume Estimates	
pCi/g	ft^3
10 - 30	1.23MM
30 - 100	829M
100 - 200	248M
200 - 500	142M
500 - 1000	17.7M
1000 - 2070	0.58M
Total	2.46MM

Plan view projection of indicated total thorium concentration at all elevations.
An estimate of contamination volume is listed in table.
Black dots indicate locations of borings surrounded by red perimeter that is used to cut away extrapolation.

Figure 2-7a - Location of Total Thorium Concentration Exceeding 1000 pCi/g--including Subsurface Molycorp, Inc. Washington, PA Facility



Side view projection (viewed from the east) of indicated total thorium concentration.
Dotted lines indicate North and South extent of data (see plan views).
Vertical distances are 10 times the horizontal distances.

Figure 2-7b - Location of Total Thorium Concentration Exceeding 1000 pCi/g--3D Side View (from East)
Molycorp, Inc. Washington, PA Facility

FIGURE 2-8
MAJOR CONSTRUCTION TASKS & SEQUENCE

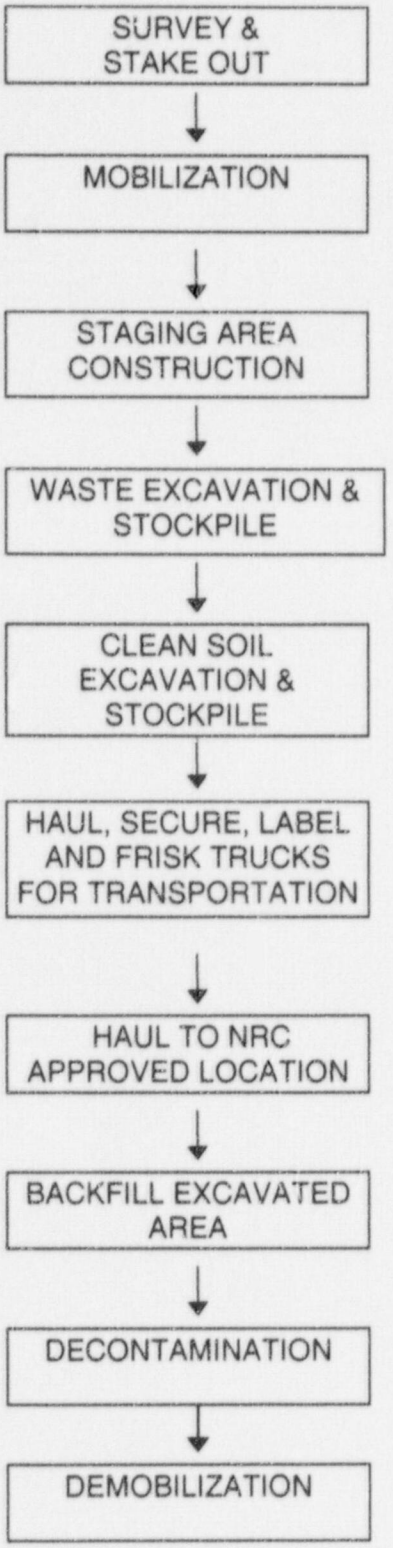
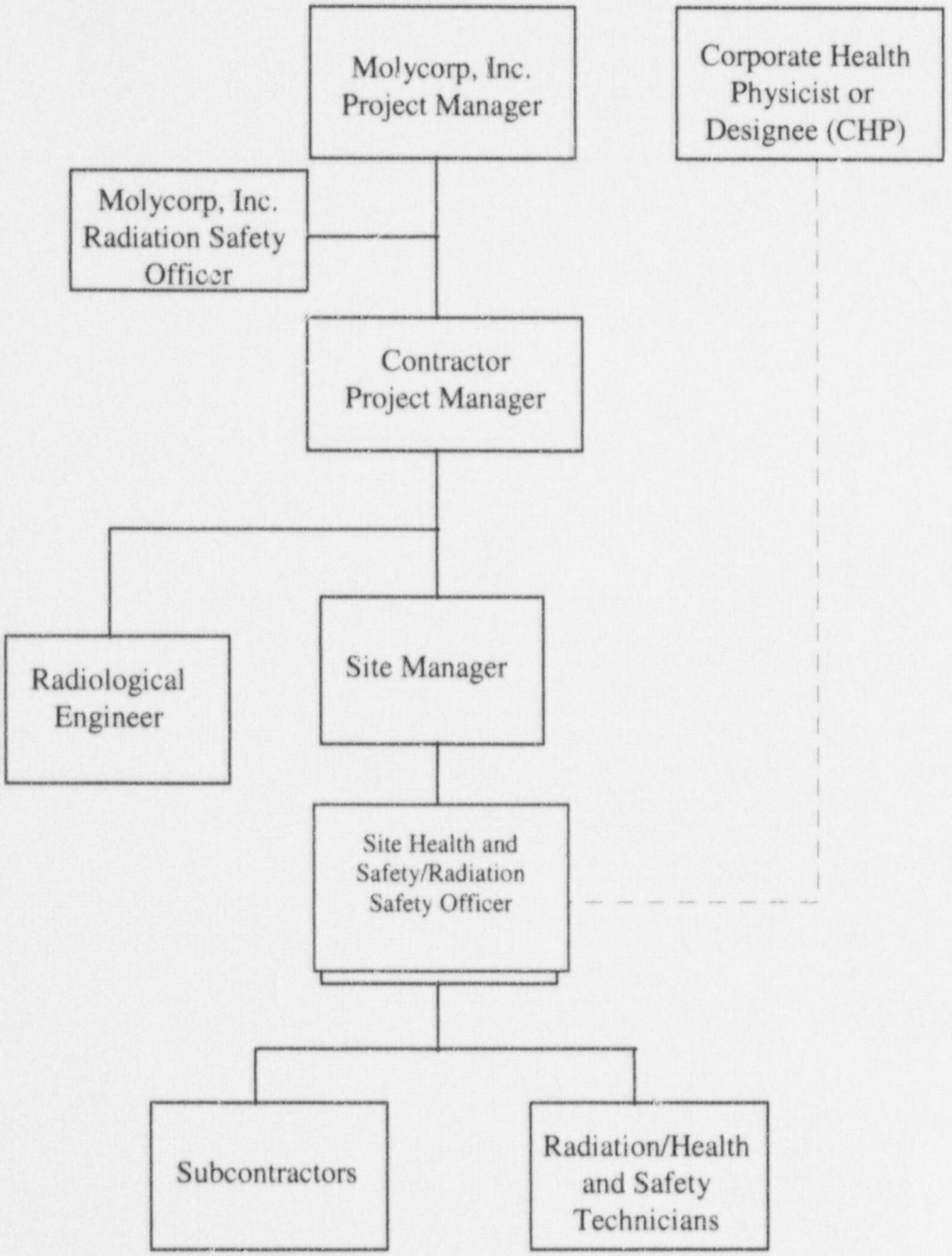


Figure 2-9
Decommissioning Project Safety Organization Chart



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The major construction tasks and their sequence are depicted in Figure 2-8. An overview is as follows:

- Survey and stake out the excavation areas, disposal area, and access road;
- Excavate the clean soil overlying waste material;
- Excavate and stockpile material greater exceeding the SDMP Action Plan unrestricted use criteria;
- Load, secure, label and frisk for transport.
- Transport the packaged material to an NRC approved location;
- Backfill the excavated areas with clean soil from the site and certified clean fill;
- Cap the backfilled open areas with clean topsoil, seed and mulch to prevent erosion; and
- Perform final decontamination of site, road, and disposal area.

2.1.3 Decommissioning Process

The overview of the decommissioning process is presented in Figure 2-8 as a series of sequential construction tasks. The crew will initiate construction of the various staging areas for temporary stockpiling of soil. The crew will then proceed to excavate the waste material from this area and, where required, the overburden. Various stockpiles will be established. The York waste material will be transported to an NRC approved location.

2.1.4 Decommissioning Schedule

As stated above, this Decommissioning Plan Part 1 Revision pertains only to the excavation of material exceeding the unrestricted use criteria, and the transport of such material to a NRC approved location. To provide the time required to fully evaluate all possible options regarding potential NRC approved locations, including the option of placing the material into an impoundment on the Washington site, Molycorp proposes to complete the decommissioning activities within 2 years of the date the plan is approved. A detailed schedule of the excavation and transport activities will be provided in the Decommissioning Plan Part 2 Revision to be submitted Apr. 2000.

2.2 DECOMMISSIONING ORGANIZATION AND RESPONSIBILITIES

Figure 2-9 presents the Decommissioning Project Safety Organization. The following sections detail the safety related responsibilities of these personnel. Due to the limited size of this project, the duties of certain personnel may be combined.

2.2.1 Molycorp Project Manager

The Molycorp Project Manager will function as the Molycorp, Inc. representative for the decommissioning project and will provide oversight for all project activities. The Molycorp Project Manager will coordinate cost and schedule reporting requirements with the Contractor Project Manager (Project Manager).

2.2.2 Decommissioning Operations Contractor (DOC) Project Manager

The DOC Project Manager will maintain overall responsibility for the performance of project operations for the duration of the project. The DOC Project Manager will report to the designated Molycorp Project Manager for all project related activities and any liaison with their Corporate Office for project oversight, management direction, and resolution of company related issues. The DOC Project Manager will control all on-site professional, technical, and labor forces to ensure the adequate and timely completion of planned project tasks. With the assistance of the assigned on-site and off-site personnel, the DOC Project Manager will ensure the following:

Maintenance of a single point of contact for Molycorp, Inc. representatives on all project related schedule, cost, safety and technical matters, including the coordination of any required communications, meetings or updates;

- Coordination of the project staff to assure that adequate safety and radiological controls, plans and procedures are enforced and that project operations are conducted efficiently and in compliance with all appropriate regulatory requirements;
- Provision of sufficient staffing to support the scheduled completion of project tasks;
- Coordination of appropriate procurement and subcontract activities in support of project goals and schedules;
- Continuous monitoring of project status and performance and the initiation of any required corrective actions or reassignment of project personnel;
- Accurate reporting to Molycorp, Inc. representatives of actual and projected project costs and up-to-date scheduled status;
- Resolution of any cost or schedule related discrepancies or questions;
- Compliance with all required procedures, operating requirements, permits or restrictions; and
- Maintenance of all appropriate project data, documents, and records and the compilation of a final report that accurately reflects the work performed.

The minimum qualifications for the Contractor Project Manager position consist of one of the following:

- B.S. degree in physical sciences, chemistry, biology, mathematics, or engineering and two years of experience in managing nuclear or hazardous waste decontamination and remediation projects;
- Four years of experience in managing nuclear or hazardous waste decontamination and remediation projects or equivalent experience.

2.2.3 DOC Radiological Engineer

The Radiological Engineer will participate in project planning and final reporting activities to ensure regulatory compliance, the adequacy of plans and procedures and the appropriate development of project specific plans and work instructions. The Radiological Engineer will also be responsible for ensuring radiological safety in the execution of decommissioning activities. The Radiological Engineer will be responsible for ensuring that radiation exposure to personnel and the environment are maintained As Low As Reasonably Achievable (ALARA) and are at all times within regulatory and administrative limits. The Radiological Engineer will report administratively to the Project Manager and will perform the following duties:

- Manage the radiological information obtained from the Site Characterization Report and Final Radiological Status Surveys, including performing all calculations to show compliance with project objectives;
- Prepare the Final Radiological Status Survey Report;
- Oversee the bioassay program to ensure proper monitoring of internal and external exposures, and assist in the training of individuals in the biological effects of radiation, as needed;
- Prepare and/or review project specific plans, procedures, and work instructions to ensure compliance with applicable guidelines, regulations, and ALARA policies;
- Assist the Site Health and Safety, Radiation Safety Officer and Radiation Health and Safety Technicians in the performance of the field effort; and
- Provide radiological calculations for dose assessment, ALARA, and safety considerations.

The minimum qualifications for the Radiological Engineer consist of one of the following:

- M.S. degree in radiological health, nuclear physics, or health physics and two years of experience as a health physicist or radiological engineer at nuclear facilities or in nuclear decontamination and remediation projects; or

- M.S. degree in physical sciences, chemistry, biology, mathematics, or engineering and three years of experience as a health physicist or radiological engineer at nuclear facilities in nuclear decontamination and remediation projects; or

- B.S. degree in radiological health, nuclear physics, or health physics and four years of experience as a health physicist or radiological engineer at nuclear facilities in nuclear decontamination and remediation projects; or

- B.S. degree in physical sciences, chemistry biology, mathematics or engineering and six years of experience as a health physicist or radiological engineer at nuclear facilities or in nuclear decontamination and remediation projects.

2.2.4 DOC Site Manager

The Site Manager will report directly to the Contractor Project Manager and will be responsible for the day-to-day activities on the project. The Site Manager will also be responsible for ensuring that personnel are provided the correct health and safety resources as required. The Site Manager will also be responsible for the coordination of daily activities with the Site Health and Safety/Radiation Safety Officer to ensure proper planning, organizing, directing, and controlling of project activities in a manner that does not conflict with the safety and health of employees performing the work activities. Specifically, the Site Manager will ensure the safety and health of employees during all project activities and will allocate the necessary resources to ensure that required safety and health activities are carried out. The Site Manager will be responsible for enforcing all applicable plans, procedures, and instructions affecting safety and health. The Site Manager is further responsible for the day-to-day oversight of all subcontractor activities to ensure that those activities are being performed in a manner consistent with all health and safety requirements.

The minimum qualifications for the Site Manager position consist of one of the following:

- B.S. degree in physical sciences, chemistry, biological sciences, mathematics, or engineering and two years of experience supervising personnel on nuclear or hazardous waste decontamination and remediation projects; or

- Four years of experience supervising personnel on nuclear or hazardous waste decontamination and remediation projects.

2.2.5 DOC Health and Safety/Radiation Safety Officer

The Site Health and Safety/Radiation Safety Officer (RSO) will report directly to the Site Manager for the day-to-day performance of project radiological activities. The RSO will receive direction from the Corporate Health Physicist or Designee (who will be a Certified Health Physicist), in the administration of all project radiological controls programs, final release activities, appropriate documentation, and compliance with all appropriate plans, procedures, practices, and regulatory requirements. The RSO will be responsible for the following:

- Developing the Site Health and Safety Plan, implementing the specific provisions of that plan, and ensuring that all site employees, subcontractors, and visitors understand the requirements of the plan;

- Functioning as the Site Health and Safety Officer with responsibility for implementing the Site Health and Safety Plan;

- Assisting the Site Manag[illegible] and other project personnel in the preparation of work plans and procedures;

- Conducting appropriate surveys and inspections while ensuring that radiological and industrial safety hazards are appropriately identified and that necessary precautions are in place prior to the initiation of work activities;

- Specifying appropriate safety and radiological controls precautions for work permits and work procedures;

- Directing the day-to-day activities of the Radiation Health and Safety Technicians in the performance of project operations and the selection of instrumentation and decontamination techniques appropriate for protecting personnel and reducing exposures;

- Monitoring work in progress to ensure compliance with project plans and procedures, regulatory requirements, and good radiological work practices;

- Preventing the performance of work activities that may jeopardize the safety of personnel, violate approved plans, procedures, or practices, or could result in the release of contamination;

- Reviewing and maintaining all appropriate project personnel and radiological records, including survey data, training documentation, certification and qualification records, release survey records, permits, licenses, and instrumentation records;

- Maintaining radiological supplies and instrument inventories; and

- Inspecting and assisting in the preparation of excavated materials for disposal, including appropriate radiological survey and assay activities.

The minimum qualifications for the RSO position consists of the following:

- Two years experience as a Radiation Safety Officer on nuclear decontamination and remediation projects on equivalent health physics experience; and

- Certification as an Occupational Health and Safety Technician.

2.3 TRAINING

The Training Program shall meet the following goals:

- Meet or exceed the applicable training requirements specified by the Nuclear Regulatory Commission, Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency;

- Ensure that all personnel are knowledgeable of requirements of their jobs and are competent in the operation of equipment they use, are safe in their work practices, and understand all risks associated with their work environment;

- Ensure that personnel will meet the requirements specified by Molycorp, Inc. to work at the Washington site;

- Ensure that personnel maintain a high level of competency in all qualified areas; and

- Indoctrinate new employees to ensure that they understand all requirements that they are expected to meet.

The Training Program describes specific training topics for visitors, general employees, radiological workers, and Health Physics Technicians in accordance with 10 CFR 19.12. Training includes classroom, site-specific, and practical factors sessions, and uses training materials that are relevant to Washington Pa. facility hazards and operations.

Contractor and subcontractor personnel working on site will also be trained in accordance with the applicable requirements of 29 CFR 1910 for general industry and 29 CFR 1926 for construction before participating in the decommissioning activities.

The DOC RSO will maintain site-specific training records in accordance with the Document Control Procedure RPP-AP-017.

2.4 CONTRACTOR ASSISTANCE

The contractor may provide personnel required for decommissioning activities by direct hiring and/or assisting subcontractors. Based on radiological considerations, these assisting subcontractors will perform their activities under the Molycorp, Inc. Source Materials License as well as applicable health and safety policies and procedures.

3.0 DESCRIPTION OF METHODS USED FOR PROTECTION OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY

The Molycorp Radiological Controls Program will ensure the protection of the public, the environment, and all workers at the Washington site. Although the DOC organization will be responsible for field implementation of procedures, as the licensee, Molycorp will retain responsibility for maintaining compliance with the requirements of 10 CFR 20. The Molycorp RSO will hold this responsibility. In practice, Molycorp will ensure 10 CFR 20 compliance via procedural approval authority, as described in Section 3.3.2, as well as through detailed oversight of the DOC's program implementation. The Decommissioning Plan Radiological Controls Program is the controlling document. All implementing procedures will be in compliance with the Decommissioning Plan.

The Radiological Controls Program has been customized for a decommissioning environment. This customization applies to both a decommissioning-specific organizational structure, and decommissioning-specific field radiological control practices. The cornerstones of the program as described below are the ALARA Program, rad material control through postings and surveillance, radiological work control via RWPs, and personnel exposure monitoring.

3.1 FACILITY RADIOLOGICAL HISTORY INFORMATION

Molycorp, Inc., formerly the Molybdenurn Corporation of America until 1974, has owned and operated a plant on the outskirts of Washington, Pennsylvania in Canton Township for over 70 years. The active site consists of approximately 20 acres, as shown previously on Figure 1-1. This section presents a summary of significant historical information about the facility and presents an historical perspective on the extent of site contamination and activities performed to address it. Site investigations that were conducted, incidents of release and inspections will also be discussed.

3.1.1 Physical Site Development and Processes

The Molybdenum Corporation of America was formed from the Electric Reduction Company in Washington, Pennsylvania on June 16, 1920. The facility was purchased to manufacture ferroalloys. Production continued into the 1940s and expanded. Interstate Route 70, adjacent to the site, was built in the 1960s and "isolates" the site on one side.

Molybdenum manufacturing was begun in the 1920s. Processing of this material was idled in 1991. Although primarily manufacturing molybdenum products, the plant also produced ferrocolumbium (FeCb, 1964 to 1971), as well as other ferroalloys. Waste slags from the ferroalloy operations, some of which contained natural thorium, were retained on the plant site, along with the larger quantity of ferromolybdenum slags that were normally used as landfill on the plant property. In 1972 some of the thoriated material from the site was disposed of at the West Valley, New York, burial site.

Additionally, Molycorp, Inc. performed cleanup operations to segregate and stabilize some of the thoriated slag and soil located at the Washington site. The segregated material was placed in a capped pile containing about 10,000 cubic yards of slag on the south property. An 8-foot steel security fence surrounds the area south of Caldwell Avenue that contains the pile. Appropriate warning signs are posted on the fence by the pile and on the pile.

New additions to the facility, built in the 1960s, were the eight surface impoundments and a large thickener. In 1978 one of two molybdenum-roasting furnaces was shut down as part of a consent decree with the Pennsylvania Department of Environmental Resources (PADER) Air Quality Agency due to exceedances Of S02 standards. All remaining processing continued. Ferrocolumbium slag cleanup at the site occurred, primarily, in the early to mid- 1970s time frame. Numerous investigations, studies and surveys were undertaken from 1970 to today to comply with regulatory requirements of the NRC.

3.1.2 Site Characterization

This section reviews the site characterization activities that have been conducted to determine the nature and extent of the contamination resulting from the ferrocolumbiurn process at the site. Field investigations and long-term monitoring have been performed over time, and the results are summarized below. The " Site Characterization Report for License Termination of the Washington Facility," January 1995, was submitted to NRC and contains the detailed information supporting this summary.

In parallel with the changing physical site development, various investigations were undertaken to address changing United States Atomic Energy Commission (USAEC or AEC) requirements almost immediately upon Molycorp, Inc. receiving a Source Materials License in late 1963 (December 19, 1963). The processing of certain types of ore concentrates for ferrocolumbium (FeCb) necessitated a Source Materials License, i.e., ore concentrates or materials containing 0.05 percent (or greater) by weight of uranium, thorium or a combination of both. Most of this material was a pyrochlore which originated from the Companhia Brasileira de Metalugia e Mineracao's Araxa mine whose ore contained thorium as an accessory mineral above the 0.05 percent limit. The slag which resulted from the aluminothermic production of ferrocolumbium alloys was in a refractory glass/ceramic form containing an average of 1.2 percent thorium. This slag, initially segregated and retained on site, continued to be generated through 1970.

In 1966, Molybdenum Corporation of America (Molycorp, Inc.'s predecessor) initiated several meetings with the Pennsylvania Department of Health's Industrial Wastes Section and AEC personnel in pursuit of an on-site burial permit. A formal application was submitted in 1967. About this time period, Molycorp, Inc.'s consultant, Applied Health Physics, Inc., conducted a series of leaching studies on the FeCb slags (1970). These studies indicated that the radioactive materials were fixed and would not leach into the groundwater in excess of prescribed limits. Nonetheless no action was taken by the state or the AEC on the request for an on-site burial permit.

In June of 1971, an AEC compliance inspection revealed that thorium-bearing slags had been inadvertently buried on-site in violation of the terms and conditions of their license and AEC regulations. It was speculated that the burial occurred during a large scale clean out of settling basins and regrading of the plant site by a private contractor who was totally unaware of the restrictions on landfilling FeCb slags.

The AEC issued a Notice of Violation and requested remedial action be taken by Molycorp, Inc. to excavate these materials and dispose of them in accordance with AEC regulations and guidance documents. Molycorp, Inc. contracted with Applied Health Physics, Inc. to perform a thorough radiological survey of the site and to provide health physics and waste disposal services necessary to comply with AEC's requests. Levels to 1.2 mR/hr were reported in some areas.

In 1972, Molycorp, Inc. authorized these materials to be excavated, sampled, concentrated as much as possible, and shipped in bulk form to an AEC-licensed waste disposal facility operated by Nuclear Fuel Services, Inc. in West Valley, New York. Disposal was terminated when New York State officials determined the slag was "of insignificant contamination and too large a volume to bury and waste valuable burial area" (Applied Health Physics, 1975). The solution implemented in 1973 was consolidating and placing the thorium slag source material into a pile covered with vegetation at the south end of the site, which was in compliance with Federal and state regulations as well as Molycorp, Inc.'s Source Material License SMB-1393. The 1975 Applied Health Physics, Inc. report and analysis of activity by gamma spectrometry indicated that the average concentration of Th-232 in the slag contained in the pile was 1,250 pCi/g, with exposures within the 0.2 mR/hr NRC (note in 1974 AEC was reorganized to the NRC and ERDA-Energy Research and Development Authority) maximum level allowed at that time.

An NRC contractor, Oak Ridge Associated Universities, conducted a radiological survey of the site in 1985, which identified elevated (twice background or greater) levels of thorium in the dikes which separated the surface impoundments, and indicated the potential of subsurface thoriated slags in the western and southern portions of the site. Figure 3-1 shows the areas on-site found to have elevated contact radiation levels at the time of that study.

In 1990, Radiation Surveillance Associates, Inc. (RSA, Inc.) conducted a sub-surface survey for Molycorp, Inc. to characterize the thorium contamination across the western portion of the site (i.e., the impoundment area), and the area immediately to the north, west, and northwest. Thirty two holes were drilled on the site and radiation measurements were logged at every six inches of depth from the surface down to bedrock, both above and below the water table. Radiation levels were also logged in monitoring wells previously drilled on the site. In addition to the subsurface measurements, RSA, Inc. conducted a scintillometer survey of the radiation exposure rates inside the study area. The surface study consisted of approximately 400 measurements of the gamma radiation field at a height of one meter above ground level. Findings revealed that, in general, the subsurface concentrations of thorium were above those in the surface soils in almost every hole drilled. A general pattern was that the underground radiation levels decreased to background at a depth of about ten feet. While a majority of the holes exhibited concentrations of greater than 0.01 percent thorium, in only a few holes did the thorium content exceed an average of 0.05 percent thorium at some point below the surface of the ground (Wrenn, Appendix 1, 1990, page 6).

In October 1992, Molycorp, Inc.'s license (SMB 1393) was renewed. This license renewal included an amendment incorporating a schedule for decommissioning the site. In November 1992, Molycorp, Inc. submitted a Site Characterization Plan (SCP) to the NRC for approval.

The Molycorp, Inc. site was investigated during the spring, summer and fall of 1994 by Foster Wheeler Environmental Corporation and samples were taken from surface water, groundwater, and soils to assess the level and type of contamination that may exist. A Site Characterization Report (SCR) for License Termination was subsequently submitted to the U.S. NRC in January 1995. The level of field effort involved soil sampling from 418 borings (12,499 soil samples) and on-site analysis for a significant portion for thorium-232 by NaI-based gamma spectroscopy using a downhole probe and/or sample analysis. In addition, selected soil samples were analyzed for a select portion of the Total Analyte List (TAL) metals and radionuclides at IEA Labs, Cary, North Carolina. Several stream sediment samples from Chartiers Creek and adjacent soil samples were analyzed for radionuclides and geotechnical parameters, respectively. Two rounds of approximately 30 groundwater samples and four Chartiers Creek water samples were analyzed for TAL metals and radionuclides.

Radium (Ra-228) was detected in measurable quantities, although considerably below the prevailing NRC standards. Thorium-232, the radionuclide of primary concern, does not exceed 5 pCi/l in either ground or surface water. Analyses of soils by both downhole and sample specific gamma spectroscopy indicated elevated total Thorium concentrations exceeding 10pCi/g in areas generally the surficial soil. These areas include the impound area, the northwest portion of the site around the thickener, the thorium pile and the center of Unit 2 (south of Caldwell Avenue).

Detailed analyses of the extent and concentration of contamination including: characterization of the source; thoriated slag/soil survey results; surface water; sediments and storm sewer sampling; groundwater; buildings and equipment; and air sampling, can be found in Section 5.0 of the Foster Wheeler Environmental Corporation SCR for the Washington, PA facility. (January 1995).

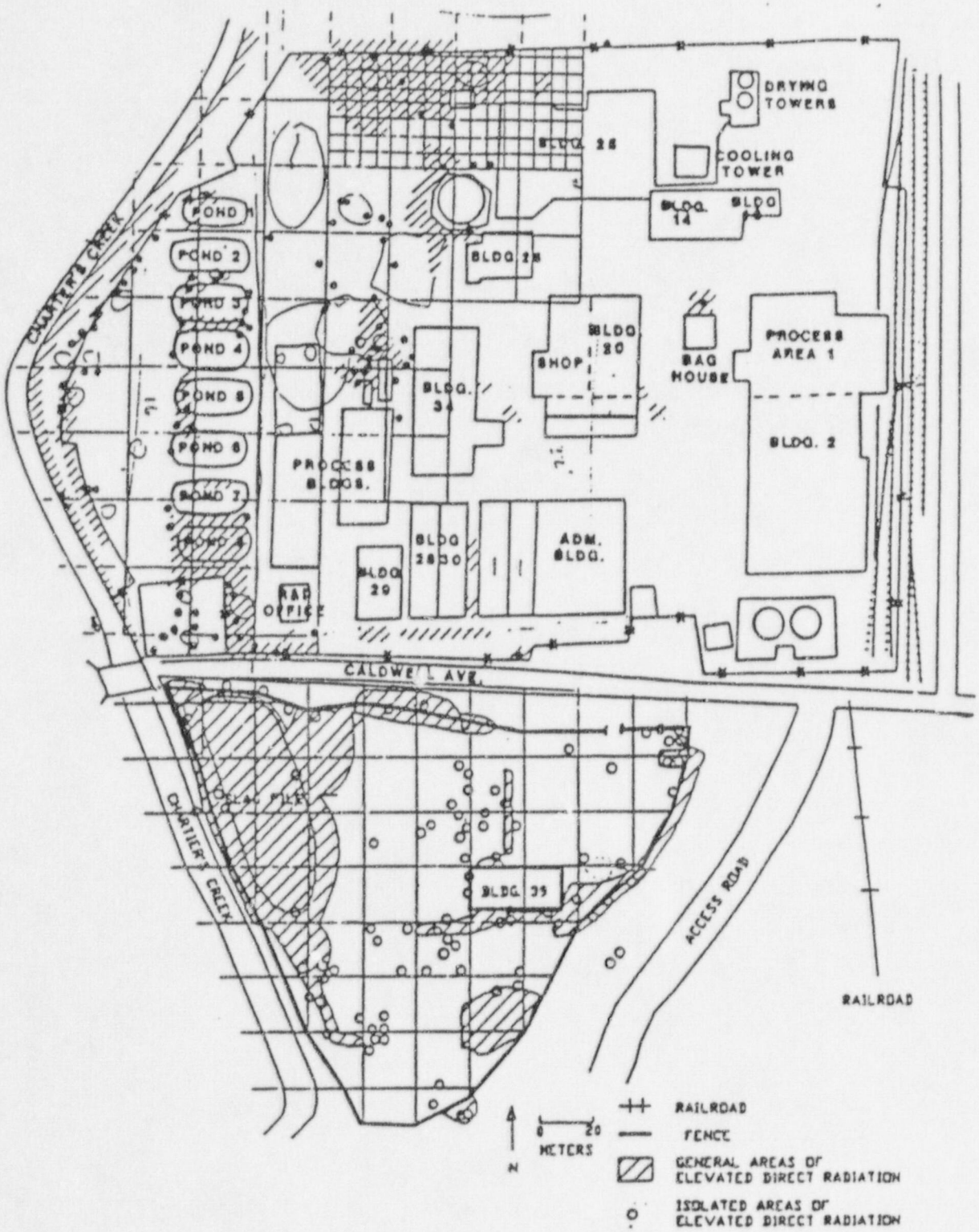

Figure 3-1 Active Plant Site and South Property with Locations of Elevated Contact Radiation Levels, 1985.

Source: Oak Ridge Associated Universities, Radiological Survey of Molybdenum Corporation of America, Washington, PA 1985.

3.2 ENSURING THAT OCCUPATIONAL RADIATION EXPOSURES ARE AS LOW AS IS REASONABLY ACHIEVABLE

Every reasonable effort to maintain radiation exposures As Low As Is Reasonably Achievable (ALARA) will be made during the decommissioning project in accordance with Regulatory Guide 8.10. The implementation of the DOC ALARA policy is the responsibility of the Contractor's Decommissioning Project Safety Organization (see Figure 2-4). These personnel along with Molycorp, Inc.'s Health and Safety Staff, will be required to review procedures, plans, or work instructions involving radiation safety. Designs or design changes for facilities, equipment, or excavation methods that may cause radiation exposure will also be reviewed by Decommissioning Project Safety Organization personnel prior to implementation These personnel are further responsible for reviewing radiation protection programs developed for implementation at the Washington site.

Requirements for the field implementation of ALARA practices are defined by procedure RPP-AP-008. Formal ALARA reviews are required for RWPs where individual exposure is expected to exceed 50 mrem TEDE or collective exposure is expected to exceed 250 mrem TEDE. The Occupational Exposure Limit for site workers is 500 mrem TEDE per year. The project person-rem goal is 5 person-rem. Molycorp does not expect site activities to result in doses to members of the public and site radiation workers in excess of 10% of the allowed limits.

Exposure totals will be tracked and trended against work group ALARA goals on a routine basis by the Radiological Engineer. ALARA goals will include personnel contamination and area contamination goals.

3.2.1 DOC Corporate Health Physicist

The Corporate Health Physicist's or Designee's (a Certified Health Physicist) responsibilities in regard to ALARA include:

- Directing an annual appraisal of the radiation protection and exposure control programs applicable to Contractor employees; and

- Overseeing and coordinating the development of exposure goals, plans, procedures, and methods for maintaining radiation exposures ALARA for all Contractor employees, subcontractors, and project visitors.

3.2.2 DOC Project Manager

The Contractor Project Manager is responsible for ensuring that criteria affecting potential radiation exposure and contamination are considered in the design, operation and construction facilities and equipment.

Other Contractor Project Manager responsibilities in regard to ALARA include:

- Ensuring adherence to the radiation protection program by all personnel assigned to the project; and
- Ensuring that ALARA reviews are performed for procedures, programs, policies, or facility design and equipment changes.

3.2.3 DOC Radiological Engineer

The Radiological Engineer is responsible for the following:

- Participating in design reviews for procedures, facilities, and equipment that can affect potential radiation exposures;
- Prescribing goals and objectives to be achieved in the area of radiological protection; Reviewing data and information obtained from radiological surveys and monitoring activities to determine compliance with ALARA policy;
- Developing methods, plans, procedures, and work instructions to keep occupational exposures ALARA;
- Reviewing training programs related to work in radiologically contaminated areas or involving radioactive materials;
- Reviewing exposure records to develop methods to reduce exposures; and
- Reviewing the supervision, training and qualifications of the radiological controls staff in all Contractor operations.

3.2.4 DOC Health and Safety/Radiation Safety Officer

The DOC Site Health and Safety/Radiation Safety Officer (RSO) is responsible for implementation of the radiation protection program for the Washington decommissioning. The radiation protection program includes all radiological standard operating procedures and those procedures written specifically for the excavation and transport of contaminated materials and associated radiological requirements. The responsibilities of the DOC RSO in regard to ALARA include:

- Ensuring adequate radiation protection coverage for all personnel, including visitors;
- Supervising, training and documenting the training of the radiation protection staff;

- Identifying sources or operations having the potential for causing above background exposures to radiation;

- Implementing the radiation protection and exposure control programs;

- Reviewing draft procedures and proposed changes in design specifications to ensure that provisions are included for maintaining exposures ALARA;

- Overseeing the collection, analysis, and evaluation of data and information obtained from radiological surveys or radiological monitoring activities used in determining hazards to occupational or public health; and

- As directed, provide a report to the Corporate Health Physicist concerning the status of radiation protection and exposure control programs in effect at the site to which the RSO is assigned.

3.2.5 Individual Employees

Each individual, who performs a work assignment for the Contractor and all Contractor subcontractors, becomes subject to the ALARA and Health Physics Policies and is responsible for complying with the Contractor and Molycorp, Inc. policy as set forth in administrative and radiological protection procedures.

3.2.6 Molycorp Radiation Safety Officer

The Molycorp RSO has the ultimate responsibility for the implementation of the Washington Site ALARA Program.

3.3 HEALTH PHYSICS PROGRAM

3.3.1 Administrative Occupational Exposure Limits

Administrative limits for occupational exposures to ionizing radiation for project workers are set below 10 CFR 20.1201 limits to control personnel exposures resulting from operations with radioactive materials.

- Daily Administrative Limit for an Occupational Worker — 100 mrem TEDE
- Administrative Limit for an Occupational Worker — 500 mrem TEDE/calender year
- Project Person-Rem Goal — 5 Person-Rem TEDE

3.3.2 Procedures

The radiological control requirements and methods that comprise the Radiological Controls Program will be governed by a complete set of detailed operational procedures. Procedures will be approved by the management of the both the DOC and Molycorp. Procedure approval signatures include the preparer, DOC RSO, and final approval by the Molycorp RSO. The procedure development and revision process will be governed by an upper tier administrative procedure.

Molycorp has developed a set of draft implementing procedures for the decommissioning activities described in this plan. The implementing procedures will be finalized after receiving the approval of the decommissioning plan and before decommissioning activities begin. Implementing procedures' content will be kept consistent with the requirements of this Decommissioning Plan. The draft procedures are available for NRC review. A list of the procedures is provided below:

Access Control of Visitors	RPP-AP-23.0
External Dosimetry Program	RPP-AP-2.0
Issue and Use of Radiation Work Permits	RPP-AP-1.0
Air Sampling and Analysis	RPP-AP-11.0
Molycorp ALARA Program	RPP-AP-80
Operation and Calibration of the Ludlum 2929	RPP-OP-105
Radiation and Contamination Survey Techniques	RPP-OP-019
Radiation Protection Program Plan	RSP-001
Radioactive Source Accountability, Inventory and Leak Testing	RPP-OP-022
Radiological Area Posting and Access Control	RPP-OP-012
Release of Materials from Controlled Areas	RPP-OP-011
Respiratory Protection Program for Molycorp, Inc.	RPP-AP-1.0.1
Volumetric Release Permitting Requirements	HP-OP-106

3.3.3 Dosimetry

The external and internal exposures received by workers will be measured and evaluated for all personnel who require access to Radiologically Controlled Areas (RCAs). The primary whole body dosimeter to be employed is the thermoluminescent dosimeter (TLD). TLDs will be processed monthly by a NVLAP certified laboratory.

The DOC RSO may require the use of self-reading pocket dosimeters (SRDs) and additional dosimeters, such as extremity TLDs, when radiological conditions warrant such use. Dosimetry requirements for a given operation or activity will be specified by a Radiation Work Permit. The DOC RSO will maintain records of exposure to ionizing radiation for those individuals wearing dosimetry. The DOC RSO will initiate an investigation if a worker's exposure reaches the procedural action level of 250 mrem in a calendar year.

Urine bioassay samples will be collected from all personnel who participate in the project dosimetry program. A baseline sample will be collected from appropriate project personnel upon mobilization, and an exit sample will be collected upon demobilization. Additional samples will be collected if the administrative action level of 10 DAC-Hrs is exceeded, or as deemed necessary by Radiological Controls management. Urine bioassay samples will be analyzed by a Molycorp, Inc. and DOC approved laboratory. It is the responsibility of the Radiological Engineer to interpret the bioassay data and perform any internal dose calculations that may be necessary.

Whole-body counting is not expected to be routinely employed during the Washington site decommissioning for determining personnel uptake of radionuclides. Whole-body counting may be employed as prescribed by the Certified Health Physicist or Radiological Engineer for extenuating circumstances.

In consultation with Molycorp's RSO, visitors to the site will be issued dosimetry as deemed appropriate by the DOC RSO. This determination will be based on radiation and contamination levels to be encountered by the visitor, the duration of the visit, and the nature of the visit. A visitor may be exempted from the requirements of the dosimetry, bioassay, and training programs at the discretion of the DOC RSO, and with the approval of the Molycorp RSO, provided that the visit is expected to be a one-time occurrence and the visitor is escorted by an individual who has proper dosimetry, has the required training for access to the site, and is familiar with site operations. Such visitors will be restricted from areas where a potential for airborne radioactivity exists.

3.3.4 Radiation Work Permits

Radiation Work Permits (RWP) will be issued for any work in a radiologically controlled area by the DOC RSO. The details of the RWP program are contained in procedure RPP-AP-001. The RWP is a tool used to control personnel exposures to ionizing radiation and radioactive material by establishing minimum requirements for dosimetry, personnel protective equipment, etc., for work to be performed and by providing specific information about radiological and other hazards in the area to be accessed.

RWPs will contain the following:

- Current radiological surveys
- Contamination control requirements
- Work area radiation, contamination, and airborne monitoring requirements
- Dosimetry requirements

- Protective clothing requirements
- Health Physics coverage requirements
- Radiological hold points
- ALARA requirements
- Special instructions
- Personnel entry logs

An RWP may be initiated by any individual responsible for a given operation or work to be performed. The DOC RSO reviews RWPs, makes any necessary changes, and then approves the RWP for use.

Personnel performing work covered by a RWP will participate in a pre-job briefing in which the requirements of the RWP are presented by a responsible individual and discussed by the work group. Personnel attending the briefing sign the RWP before entering the Radiologically Controlled Area to indicate that they understand, and agree to comply with, the requirements of the RWP.

The DOC RSO will maintain the RWP original, and provide copies to the job site, and the Molycorp RSO.

An RWP is terminated by the DOC RSO when radiological conditions change, the scope of work changes, or a specified period of time has elapsed. Since RWPs are task-specific, it is likely that several RWPs will be in effect at any given time during the course of the Washington site decommissioning.

3.3.5 Radioactive Material Control

Radioactive material is controlled to ensure that contaminated soil or slag is not inadvertently removed from designated areas, that no equipment or vehicles leave the site with surface contamination above acceptable release levels, and to minimize personnel contamination. The acceptable surface contamination free release levels at the Washington site are those listed in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," Policy and Guidance Directive FC 83-23.

Controlled access areas are established for the purpose of controlling radiation exposures to site workers, visitors, and the general public, and to control the spread of contamination

Signs at points of entry into the fenced area surrounding the Washington site will instruct visitors and other individuals unfamiliar with decommissioning operations at the site to register at the Molycorp, Inc. visitors' office. Upon reporting to Contractor personnel, the individual can be escorted to any area to which he/she may need access.

Subcontractors and other personnel who will perform work on the site will be given orientation and training that will make them aware of areas that they may access and the requirements for entering such areas.

RCAs will be posted in accordance with 10 CFR 20.1902, and include Contamination Areas, Radiation Areas, Airborne Radioactivity Areas, and Radioactive Material Storage Areas. It is anticipated that there will be no High Radiation Areas or Very High Radiation Areas posted during the course of the Washington site decommissioning. RCAs will be posted with radiation warning signs that will normally be suspended from yellow and magenta colored rope or ribbon or affixed to posts or doors. Some of the requirements for entering a RCA are listed on the posted radiological warning signs applicable to a given area. The remainder of the requirements for entering a given RCA will be contained in the active RWPs.

There will be no eating, drinking, smoking, chewing, or application of cosmetics within RCAs. The need for respiratory protection shall be evaluated and documented via the RWP process for all personnel entering an Airborne Radioactivity Area.

High traffic areas outside of RCAs, especially paths to and from RCA accesses, restrooms, break/lunch rooms, and field office spaces, will be frequently surveyed for radioactive surface contamination to ensure that these areas are maintained essentially free of radioactive contamination above background levels. The periodicity of these routine surveys are determined by the DOC RSO and specified in procedure RPP-OP-017. Typically, high traffic areas, access/egress points and areas downwind of exposed contaminated soil will be surveyed daily. Clean areas shall be promptly decontaminated or controlled as RCAs if surface contamination levels are found to exceed guideline values.

Except for sources that are permanently attached to detection instruments, radioactive check sources not in use will be stored in a locked cabinet designated by the DOC RSO. The number of keys to the cabinet and the number of personnel having access to the keys will be kept to a minimum Radioactive check sources stored on site will be inventoried semi-annually.

Radioactive waste will be stored in designated Radioactive Material Storage Areas after it is removed from an RCA. Radioactively contaminated tools, equipment, and other materials will be marked with yellow and magenta colored tape or equivalent and will be stored in RCAs until they are decontaminated or otherwise disposed of as radioactive waste. Radioactive materials transported through uncontrolled areas will be covered with tarps or dust-suppressed as necessary to prevent the spread of contamination while transiting these uncontrolled areas.

Spread of contamination will be minimized by:

- Posting areas with removable contamination in excess of guideline values as contaminated areas,
- Requiring personnel who enter contaminated areas to wear anti -contamination clothing specified by the applicable RWP,
- Ensuring that personnel remove contaminated clothing properly and place used anti-contamination clothing in designated receptacles upon exiting a contaminated area,

- Monitoring personnel, materials, and equipment using alpha probes for the presence of radioactive contamination upon exiting or removal from a contaminated area,

- Decontaminating personnel or equipment, or controlling items as radioactive material, as appropriate; performing contamination surveys frequently inside contaminated area, along the perimeters of contaminated areas, and at the exits of contaminated areas,

- Wetting soils during excavation activities to prevent the spread of fugitive dust, and

- Continuous air monitoring during radioactive soil handling.

Concentrations of airborne radioactivity in radiologically controlled and non-radiologically controlled areas will comply with the standards in 10 CFR 20, Appendix B, Table 1 or Table 2 as appropriate.

Concentrations in liquids to be released from the site will comply with the standards established in 10 CFR 20, Appendix B, Table 2 or 3, as appropriate.

3.3.6 Radiological Controls for Excavation and Temporary Storage of Clean Overburden and Radioactive Soils

Remediation of the site will consist of excavation of clean overburden and radioactive soils that exceed 10 pCi/g average total thorium. All soil excavation and transport activities will be conducted under a specific RWP. The key to controlling the extent of digging, thus reducing safety risks, is the continuous presence of HP technicians to monitor and sample as the dig progresses. The technician ensures that clean overburden and contaminated soils are not mixed, and that clean over-burden is stored separately for use as back-fill. Contamination control measures for temporary storage of contaminated soils include berms, coverings, and postings. The duration for temporary storage of radioactive soils will typically not exceed two to three weeks.

Soil excavation activities will be stopped, and an investigation conducted, if the following action levels, are observed:

- Contamination above site release criteria (i.e 10 pCi/g average Total Thorium) outside of posted areas,

- Airborne radioactivity levels above 2 DAC (Respiratory Protection, posting, and tracking is required at 0.1 DAC),

- Drum or container excavated,

- Potential mixed waste/hazardous waste seen or odor detected.

Awareness of the current radiological conditions of the soil is stressed to minimize waste volumes, cross contamination, and over-digging. Air monitoring practices are described below.

3.3.7 Radiological Controls for Truck and Vehicle Transport

Trucks and vehicles that exit radiologically controlled areas will be surveyed for both fixed and loose contamination as well as exposure rates. Vehicles above the free release limits will be decontaminated and re-surveyed prior to release. The HP supervisor will be notified of contaminated vehicles. Special attention will be given to tires, the floor of the cab, and tailgates. Wet or muddy surfaces will be cleaned and dried prior to survey. Smears taken will be analyzed for alpha and beta-gamma contamination. Vehicle surveys will be documented by HP and forwarded to Document Controls.

3.3.8 Airborne Monitoring

Airborne particulate monitoring is performed to:

- Demonstrate compliance with the intake limits for workers specified in 10 CFR 20.1204,
- Meet the posting requirements for Airborne Radioactivity Areas per 10 CFR 20.1902,
- Determine whether precautionary measures such as process or engineering controls, increased surveillance, access limitation, or use of respiratory protective equipment, should be considered per 10 CFR 20.1702
- Determine whether exposures to radioactive materials are being maintained ALARA.

The system used for monitoring airborne radioactivity shall have a Minimum Detectable Activity (MDA) not greater than 10 percent of the applicable Derived Air Concentration (DAC). Sample practices will be in accordance with ANSI N 13.1. Excavation work will be stopped when airborne radioactivity levels have exceeded, or are suspected to have exceeded, the procedural action level of 2 DAC

Personnel air samplers (lapel samplers) will be employed whenever contaminated soil is being excavated to more accurately measure the concentrations of airborne radioactivity in the breathing zones. At least one member of the excavation crew, as well as each heavy equipment operator, will have a lapel sampler. The use of lapel samplers will be evaluated as the project proceeds by comparing the general area air samples to the lapel sample results. Adjustments to the number of personnel assigned label samples will be made as necessary. Portable air sampling during contaminated soil excavation will be performed in the work area and at each work area boundary. This will provide three layers of air sampling, personnel lapels, work area boundaries, and routine air sampling at site boundaries.

Routine air samples shall be performed in accordance with RPP-AP-011 at site boundaries and areas of high personnel traffic.

Portable air particulate sampling equipment will be immediately available during abnormal conditions. Site specific airborne particulate surveys will be performed as identified in the project ALARA briefing.

3.3.9 Respiratory Protection Program

Respiratory protection requirements will be specified in the applicable RWP. The respiratory protection program will meet all of the requirements of 10 CFR 20 Subpart H. The RSO will specify appropriate respiratory protective equipment based upon measurement of actual airborne radioactive contamination, suspicion/likelihood of airborne contamination in excess of applicable limits, and consultation with the Certified Health Physicist or Radiological Engineer. Respiratory protection will not be employed until engineering controls (e.g. HEPA ventilation) have been evaluated and implemented where applicable (10 CFR 20.1101 (b)). Respiratory protection will be required at 0.1 DAC.

Prior to using respiratory protective equipment, Contractor and subcontractor employees will be physically examined to determine their fitness for using respiratory equipment and fit tested to ensure that a proper seal can be obtained between the individual's face and the respirator selected. These physical examinations will be updated annually in accordance with 10 CFR 20.

Personnel required to wear respiratory protective equipment will be trained in the proper use and care of the respiratory protective equipment to be employed per the requirements of 10 CFR 20 Subpart H, ANSI Z88.1, Reg, Guide 8.15, and NUREG 0041. This training will contain the following minimum elements:

- When and why respiratory protection is required,
- The operating principles of the selected respiratory protective equipment and its limitations,
- Procedures to ensure proper fit of the respirator,
- Proper care and maintenance of the selected respirator, and
- Emergency actions to be carried out by individuals who experience respirator failure or malfunction, physical or emotional distress, procedural or communication failure, significant deterioration of operating conditions, and any other condition that might require relief.

The potential for an intake of radioactive material through inhalation remains relatively low based on a review of past radiological surveys and existing data. High Efficiency Particulate Air (HEPA) filtered exhaust ventilation shall be evaluated and used inside any buildings or containments in which airborne radionuclides may present a hazard. If air sampling indicates the need for respiratory protection, full-face negative pressure respirators with HEPA filters shall be the first choice. If air samples indicate airborne contamination levels are sufficiently high, air supplied respirators shall be used to work in the affected areas.

3.3.10 Personal Protective Clothing Requirements

The HP Technicians and DOC RSO will determine the appropriate requirements for personal protective clothing for a given operation or activity and will include these requirements on the applicable RWP.

Typical protective clothing for soil excavation will be Tyvec coveralls, shoe covers, and gloves. It is anticipated that disposable personal protective clothing will be employed during the Washington site decommissioning. Soiled disposable clothing will be packaged into steel drums, or other appropriate containers, so that it can be efficiently volume-reduced.

The use of launderable anti-contamination clothing will also be considered. If selected, launderable anti-contamination clothing will either be laundered on-site or processed regularly by an off-site vendor.

3.3.11 Quality Assurance

During the course of the Washington site decommissioning project, one or more audits of project activities and records will be performed by qualified personnel from the Contractor Quality Assurance Department. Records and activities will be reviewed and compared to the requirements of Contractor procedures. Results of audit findings will be addressed by Contractor corporate management and the Contractor Project Manager and reviewed with Molycorp, Inc.

Molycorp will audit aspects of the DOC's Radiological Controls program periodically such that content and implementation in all areas is reviewed annually (10 CFR 20.1101 (c))

Calibration of all portable radiological instruments will be performed semi-annually, or more frequently if specified by the instrument operating manual, and after repairs or maintenance that could have invalidated the instrument's current calibration. The Certified Health Physicist, the Radiological Engineer, or the RSO will determine whether or not a given instrument requires calibration more frequently than semi-annually. Radiological field survey equipment and laboratory analysis equipment shall be calibrated by qualified personnel using standards traceable to the National Institute of Standards and Technology (NIST).

Portable survey instruments, self-reading pocket dosimeters, counter-scalers, and air sampling equipment will have a current calibration prior to use. The RSO is responsible for ensuring that all such equipment for the Washington site decommissioning maintains a current calibration label and that records of the current calibration are on file. In addition to records of calibration, the RSO will maintain a copy of the operating manual provided by the manufacturer for each type of instrument in use at the project

3.3.12 Document Control

All Rad Controls records will be maintained and retained in accordance with the Document Controls procedure (RF-AP-017) At a minimum, decommissioning records will be kept until the site is released for unrestricted use.

Records include:

- RWPs
- Radiological surveys
- Instrument calibration and maintenance
- Source inventory and storage
- Shipment records
- Accounts of incidents
- Internal and external dosimetry
- Training
- Visitor logs

3.4 RADIOACTIVE WASTE MANAGEMENT

As stated in Section 2.0, soil, slag material, or other material with an average total thorium concentration of 10 pCi/g or more will be excavated and stockpiled on various staging areas on site. These staging areas will be selected based on the conditions at the time the staging is required. As the project proceeds, the staging locations are expected to change. While placing excavated waste in one staging area, waste from another staging area will be loaded into dump trucks and transported to an NRC approved location for permanent disposition. The south pile contaminated volume will also be transported to an NRC approved location for permanent disposition. All waste staging areas will have bottoms with HDPE or VLDPE liners and will be wetted or covered to prevent the spread of fugitive dust.

Handling, shipment, and storage of radioactive wastes will be handled in accordance with 10 CFR 20.2006, "Transfer for Disposal and Manifests," 49 CFR 100-177, "Transportation of Hazardous Materials," and 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

4.0 FINAL RADIOLOGICAL STATUS SURVEYS

The purpose of the Final Radiological Status Surveys is to demonstrate that the radiological conditions of the Washington site satisfy the limits and guidelines approved for the Washington site (Section 2.1.1 of this Decommissioning Plan), and that the site is suitable for unrestricted use. The final surveys will be performed in accordance with the guidance in NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination."

4.1 Unrestricted Use Limits

The unrestricted use limits for the Washington site are those listed in the SDMP Action Plan. The averaging criteria that will be applied are in accordance with NUREG/CR-5849 and other NRC guidance documents as referenced.

Unrestricted Use Limits for Building Surfaces and Structures

- Average and maximum direct (fixed plus removable) surface contamination limits, and removable surface contamination limits as specified in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," Policy and Guidance Directive FC 83-23.

- Average exposure rate of 5 uR/hr above background, at 1 m from building surfaces, over 10 m^2 of contiguous surface area. No discrete location will exceed 10 uR/hr above background, at 1 m.

Unrestricted Use Limits for Soil and Slag

- 10 pCi/g average Total Thorium (Th-232 + Th-228)

- 10 pCi/g average Uranium (U-238 + U-234, assuming all daughters in equilibrium)

- Average exposure rate of 10 uR/hr, above background, at 1 m from the ground surface. No discrete location will exceed 20 uR/hr above background at 1 m.

- The average limit for soil concentrations and exposure rate levels will be met in each 100 m^2 grid area.

- Elevated areas of soil contamination that are less than 100 m^2 in size are acceptable if they meet the $(100/A)^{1/2}$ criteria from NUREG/CR-5849, and the weighted average in the 100 m^2 grid containing the elevated area does not exceed the average limit.

- Subsurface soil and slag will be surveyed and averaged to demonstrate compliance with the unrestricted use limits using the NRC guidance contained in the February 13, 1997, letter from John T. Buckley, NRC, to Howard A. Pulsifer, AAR Corporation.

The radiological conditions described above will be demonstrated at a 95% confidence level for each survey unit as a whole. A survey unit for soil will include several 100 m^2 grids.

The number of samples collected per survey unit will be based on the potential for residual radioactivity. Contamination potential will be based upon a review of the results of the Radiological Characterization Survey and surveys taken during decontamination operations.

4.2 BACKGROUND DETERMINATION

The background concentrations determined during the site characterization will be evaluated for use in the final status survey. If significant inconsistencies between the methods used to analyze characterization and final survey samples are identified, new background concentrations will be determined for use during the final survey. The background concentrations will be used to calculate net concentrations in site soil and slag for comparison to the unrestricted use limits.

4.3 AREA CLASSIFICATION

For purposes of establishing the sampling and measurement frequency and pattern, the Washington site will be divided into Affected and Unaffected areas. The bases for these classifications are:

Affected Areas - Areas that have potential radioactive contamination (based on plant operating history) or known radioactive contamination (based on actual radiological surveys).

Unaffected Areas - All areas not classified as Affected Areas. These areas are not expected to contain residual radioactivity based upon survey information These are areas where characterization and decontamination surveys detected no residual activity in excess of guideline values.

The majority of the Washington site will be designated as an affected area, as indicated in Figure 2-1, which shows the a significant portion of the site potentially contains contamination exceeding 10 pCi/g total thorium.

4.4 REFERENCE GRID SYSTEM

A reference grid system was established during the Radiological Characterization Survey. This grid system will also be used for the Final Radiological Status Survey. Portions of the grid system will have to be re-established as a result of decontamination activities that destroyed grid markings on original surfaces. Using the reference grid system established for the Radiological Characterization Survey ensures consistency between the Characterization and Final Survey results.

4.5 SURVEY UNITS

The Washington site will be subdivided into individual survey units having common contamination potential so that the radiological condition of the property is evaluated section-by-section. A survey unit is a grouping of contiguous surfaces, rooms, or areas with similar use history that have the same classification of contamination potential. In no case shall Affected and Unaffected Areas be included within the same survey unit. When dividing areas into survey units, areas that are naturally distinguishable from other areas, in addition to sharing a common contamination potential, will be grouped into individual survey units.

The determination of compliance with the average unrestricted use limits listed in Section 4.1 will evaluated on a survey unit basis. Each survey unit must be shown to meet the average soil concentration, surface contamination, and exposure rate limits at a 95% confidence level.

4.6 SURFACE SCANS

Scanning of surfaces to identify locations of elevated activity will be performed according to the following schedule:

Building and Structure Surfaces

- Affected Area surfaces - 100% of floor and lower wall surfaces (< 2 meters from floor) and other surfaces in Affected Areas found to have residual activity in excess of guideline values during the Radiological Characterization Survey;

- Upper surfaces (> 2 meters from floor) of Affected Areas found to be non-contaminated during the Radiological Characterization Survey - scans in immediate vicinity of direct measurements; and

- Unaffected Area surfaces - 10% of floor and lower wall surfaces (< 2 meters from floor).

Building interior and exterior surface scans will be conducted for beta-gamma radiation. In selected areas, alpha radiation scans will be performed to verify that the beta-gamma radiation scans have identified the contaminated areas. Interior and immediately adjacent soil surfaces will be scanned for gamma radiation only.

The instruments having the best sensitivity will be used for the scans accounting for the condition of the physical surface. Instruments with audible indicators will be used to identify locations having elevated levels of directly measured radiation exceeding two times background. Locations of surface activity exceeding twice background shall be marked for further evaluation.

Outside Areas – Ground Surface and Excavated Surfaces

- Affected Areas-100% coverage of affected open land areas scanned to identify areas of elevated activity

- Unaffected Areas-10% of areas uniformly scanned.

4.7 SURFACE ACTIVITY MEASUREMENTS

4.7.1 Direct Measurements

Direct measurements of alpha, beta-gamma, or gamma surface activity will be performed at selected locations using instrumentation similar to that selected for the same measurements performed during the Radiological Characterization Survey. Unless precluded by surface condition or physical parameters, the most sensitive of the instruments available will be used for direct surface measurements. Measurements will be performed by integrating counts over a sufficiently long period of time to achieve a satisfactorily low MDA. Count times will be determined on site based on background levels and detector efficiency.

If scanning methods are capable of detecting a residual thorium activity of less than 1,000 dpm/100cm2, direct surface activity measurements will be systematically performed at two meter intervals on floors and lower walls of Affected Areas and at the same intervals on upper surfaces of Affected Areas. If scanning methods produce an MDA that exceeds 1,000 dpm/100 cm2, measurements will be performed at one meter intervals.

On upper surfaces of Affected Areas that are not scanned for the presence of residual activity (areas where the Radiological Characterization Survey detected no residual activity in excess of 5,000 dpm/100 cm2 measurements will be performed at a minimum of 30 locations on both vertical and horizontal surfaces. These locations will include surfaces where radioactive material would likely settle and sufficient additional locations to provide coverage at a minimum of one location per 20 m2 of surface area.

4.7.2 Removable Surface Activity Measurements

A smear sample for removable contamination will be collected from each location where a direct surface activity measurement is made. These samples will be analyzed for alpha and beta-gamma contamination.

4.8 EXPOSURE RATE MEASUREMENTS

Gamma exposure rates will be measured at a distance of one meter perpendicular to building surfaces, using a gamma scintillation instrument detector calibrated for natural thorium, radiation energies. Measurements will be uniformly spaced according to the following pattern (based on parameters in NUREG - 5849):

Building interiors

Affected Areas: one measurement per 4 m2
Unaffected Areas: one measurement per 50 M2

Soil areas

Affected Areas: four measurements per 100 m2 gridblock
Unaffected Areas: one measurement at each soil sample location

4.7 SOIL SAMPLING

4.7.1 Sampling of Surface Soil

Samples of surface soil will be systematically collected from the four points midway between the center and each gridblock corner for each 100 m2 grids in Affected Areas. In Unaffected Areas, a minimum of 30 samples will be collected in each unaffected survey unit. Soil samples will be analyzed to determine radioactivity concentrations.

4.7.2 Sampling of Subsurface Soil

Section 3.5 details the extent of soil contamination (volume, depth, and concentration) and the proposed method for removal. When practical, for cost effectiveness, soil samples will be taken at the completion of excavation, using Final Status Survey procedures, to ensure that contaminated soil layers have been properly bounded and removed. Additional subsurface sampling will be performed as part of the Final Status Survey.

4.10 OTHER MEASUREMENTS AND SAMPLES

4.10.1 Building Interiors

Exterior of piping and ventilation ducting in Affected Areas will be surveyed by beta-gamma scans to determine locations that exceed background (typically two times background). At these locations, and at available access points to pipe and ducting interiors, direct alpha measurements and smear samples for removable contaminants will be taken. Radiological Pipe Crawlers will be used to survey interior pipe surfaces where applicable, including in situ surveys of underground or embedded piping.

Remaining ducts, electrical boxes, conduits, or other interior surfaces in Affected Areas that may contain residual contamination, will be accessed, and measurements of direct and removable activity will be performed.

4.10.2 Building Exteriors

Measurements of direct and removable activity will be performed on exterior and interior surfaces of air exhaust equipment and at roof drains. Samples of roofing material will be obtained where direct measurements indicate contamination is present.

Exterior walls will be surveyed as if they were Unaffected Area interior walls. The exterior surface of the roof will be scanned for gamma radiation as if it were an Affected Area interior floor.

4.11 SAMPLE ANALYSES

Smears and swabs for removable contamination will be counted for gross alpha and gross beta-gamma activity. Soil will be analyzed for natural thorium concentration by gamma spectrometry. Chain-of-custody procedures will be observed for all sample analyses.

4.12 DATA INTERPRETATION

Radiological measurement data will be converted to units of dpm/100 m2 (surface activity), uRem/hr (exposure rates), and pCi/g (soil radionuclide concentrations) for comparison to guideline values. Values will be adjusted for contributions from natural background. Individual measurements and soil concentrations will be compared to guideline values for maximum activity locations. Average values for survey unit radiological parameters will- be determined and compared to guideline values for average activity. Data collected during the Final Radiological Status Survey for each survey unit will be tested against the confidence level objective of 95% using guidance and procedures described in NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination," June, 1992.

Additional remediation and/or further sampling and measurements will be performed where guidelines are not met or cannot be demonstrated to the 95% confidence level. Computations and comparisons will be repeated as necessary.

4.13 FINAL RADIOLOGICAL STATUS SURVEY REPORT

The Contractor will prepare a Final Radiological Status Survey Report that will provide a complete record of the radiological status of each survey unit at the Washington site.

5.0 FUNDING

In a letter to NRC dated March 30, 1999, the Chief Financial Officer of Union Oil Company of California (Union Oil) submitted all of the necessary information to demonstrate that Union Oil qualifies for a "Parent Company Guarantee" under 10 CFR 40.36. Union Oil will use a "Parent Company Guarantee" in the amount of $ 4 5 million as the financial assurance mechanism for the Molycorp, Inc, Washington, PA, site.

6.0 PHYSICAL SECURITY PLAN AND MATERIAL CONTROL AND ACCOUNTING PLAN PROVISIONS IN PLACE DURING DECOMMISSIONING

The numerous previous radiological assessments of the Washington site, have not identified any special nuclear material at the site. Therefore, a Physical Security and Material Control Plan will not be developed or implemented during the decontamination and decommissioning. The Washington facility is located within an area having controlled access.

7.0 RECORDS/REPORTS/NOTIFICATIONS

All records that are generated through the performance of the Washington facility decommissioning activities will be maintained in accordance with Molycorp, Inc.'s License requirements.

REFERENCES

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