

Garrett, Betty

From: John Schmuck [John_Schmuck@Cameco.com]
Sent: Tuesday, March 15, 2011 4:22 PM
To: Burrows, Ronald
Cc: Josh Leftwich
Subject: Draft Crow Butte Sampling Plan
Attachments: Draft Crow Butte Sampling Plan.docx; CSA AIR MONITOR STATONS-2-Model (2).pdf; MINEWIDE-air-test-update-3-Model.pdf; PLANT-AIR-TEST-3-Model.pdf

Ron - Attached please find a draft Crow Butte Sampling Plan offered to facilitate our discussions at the public meeting scheduled Thursday March 17, 2011. The attachment includes the draft sampling plan and three figures.

thanks. .john

This email and any files transmitted with it are personal and confidential, and are solely for the use of the individual or entity addressed. Therefore, if you are not the intended recipient, please delete this email and any files transmitted with it (without making any copies) and advise the author immediately.

Draft Crow Butte Sampling Plan, March 15, 2011

Type and Location	Analytes	Instrumentation	Frequency/Duration	LLD(s)/DQOs	References/Notes
Air Monitoring Stations Perimeter (existing) - AM-1, AM-2, AM-3, AM-4, AM-5, AM-6 and AM-8 Plant to Perimeter (new) - AM-22 (injection spill), AM-23 (production spill), AM-24 (near plant), AM-25 (near plant) (see Figures 1 and 2)	Gamma	Landauer InLight OSL with aluminum oxide detector. 1mrem to 1 rem range, 1 meter above ground level.	Quarterly for one year	1 mrem	Also used for isotopic analysis
	Particulate- ^{Nat} U, ²²⁶ Ra, ²³⁰ Th, ²¹⁰ Pb	Eberline RAS-1 (or equivalent) regulated air pump, Type A/E glass fiber filter paper, 30-40 l/min	Quarterly composites of weekly samples for one year	^{Nat} U – 1x10 ⁻¹⁶ , ²²⁶ Ra – 1x10 ⁻¹⁶ , ²³⁰ Th – 1x10 ⁻¹⁶ , ²¹⁰ Pb – 1x10 ⁻¹⁵ uCi/mL	
	Radon	Radtrak [®] Type DRNF	Semiannual for one year	2x10 ⁻¹⁰ uCi/mL	
Well House (exterior) WH-9, WH-17, WH-47, WH-50 (see Figures 1 and 2)	Gamma	Landauer InLight OSL with aluminum oxide detector. 1mrem to 1 rem range, 1 meter above ground level.	Quarterly for one year	1 mrem	
	Radon	RadTrak [®] Type DRNF	Semiannual for one year	2x10 ⁻¹⁰ uCi/mL	
Well House Radon Daughters (interior) WH-9, WH-17, WH-47, WH-50 (see Figures 1 and 2)	Radon Daughters	Lapel samplers, SKC Aircheck XR5000 Sampling Pump (or equivalent) with a flow of 5 to 5000 ml/minute	5-minute grab on monthly basis for one year	0.033 WL	Modified Kusnetz
	Radon	Radtrak [®] Type DRNF	Semiannual for one year	2x10 ⁻¹⁰ uCi/mL	
Near Plant (exterior) 1-TE, 2-TE, 3-TE, 4-TE, (radon and gamma) (see Figure 2)	Gamma	Landauer InLight OSL with aluminum oxide detector. 1mrem to 1 rem range, 1 meter above ground level.	Quarterly for one year	1 mrem	
	Radon	Radtrak [®] Type DRNF	Semiannual for one year	2x10 ⁻¹⁰ uCi/mL	
In-Plant Isotopic Analysis 1-IST, 2-IST, 3-IST, 4-IST, 5-IST, 6-IST (see Figure 3)	Particulate- ^{Nat} U, ²²⁶ Ra, ²³⁰ Th, ²¹⁰ Pb	RADECO Model HD-29A or equivalent, glass fiber filter paper	Semiannual for one year	^{Nat} U – 1x10 ⁻¹⁶ , ²²⁶ Ra – 1x10 ⁻¹⁶ , ²³⁰ Th – 1x10 ⁻¹⁶ , ²¹⁰ Pb – 1x10 ⁻¹⁵ uCi/mL	
In-Plant Radon Daughters 1-R, 2-R, 3-R, 4-R, 5-R, 6-R, 7-R, 8-R, 9-R, 10-R, 11-R, 12-R, 13-RE, 13-RM, 13-RW (see Figure 3)	Radon Daughters	Lapel samplers, SKC Aircheck XR5000 Sampling Pump (or equivalent) with a flow of 5 to 5000 ml/minute	5-minute grab on monthly basis for one year	0.033 WL	Modified Kusnetz
In-Plant Airborne Area Samples 1-A, 2-A, 3-A, 4-A, 5-A, 6-A, 7-A, 8-A (see Figure 3)	Long-lived Gross α	Eberline RAS-1 (or equivalent) regulated air pump, Type A/E glass fiber filter paper, 30-40 l/min	Minimum of 90 minutes	4.8x10 ⁻¹¹ uCi/mL - 10% of the Cameco process-specific DAC.	

Draft Crow Butte Sampling Plan, March 15, 2011

Type and Location	Analytes	Instrumentation	Frequency/Duration	LLD(s)/DQOs	References/Notes
α/β/γ Campaign for Dose Evaluation (Same locations as quarterly gamma surveys, see Attachment 1)	α	Total surface activity Ludlum Model 2241 scaler or Model 177 Ratemeter with Model 43-65 or Model 43-5 or equivalent	Quarterly for six months	100 d/m-100 cm ² (10% of the release limit)	
	βγ	Portable GM survey meter with β/γ probe. Ludlum Model 3 Survey meter or equivalent, with Ludlum 44-38 probe, 44-9 probe or equivalent.	Quarterly for six months	500 d/m-100 cm ² dpm/100 cm ² (50% of the removable contamination limit)	
	Removable β (swipes)	Ludlum Model 3030 alpha/beta counter	Where β is present	200 d/m-100 cm ²	
α/β/γ Campaign for Personal Contamination	Total alpha and total beta	Model 43-5 or 43-65 alpha detector with Model 177 ratemeter or equivalent, and model 44-9 beta detector with Model 3 ratemeter or equivalent.	2-week evaluation, >80% of all personal contamination surveys performed	100 d/m-100 cm ² for alpha and 500 d/m-100 cm ² for beta/gamma	
α/β/γ Campaign for Contamination Control	Total alpha and beta	Same as above	Free releases for next 20 trucks and next 20 pieces of equipment	Same as above	
	Removable alpha and beta	Model 3030 alpha/beta sample counter	Where α and/or β contamination is detected in excess of the removable contamination limit based on survey meter measurements.		

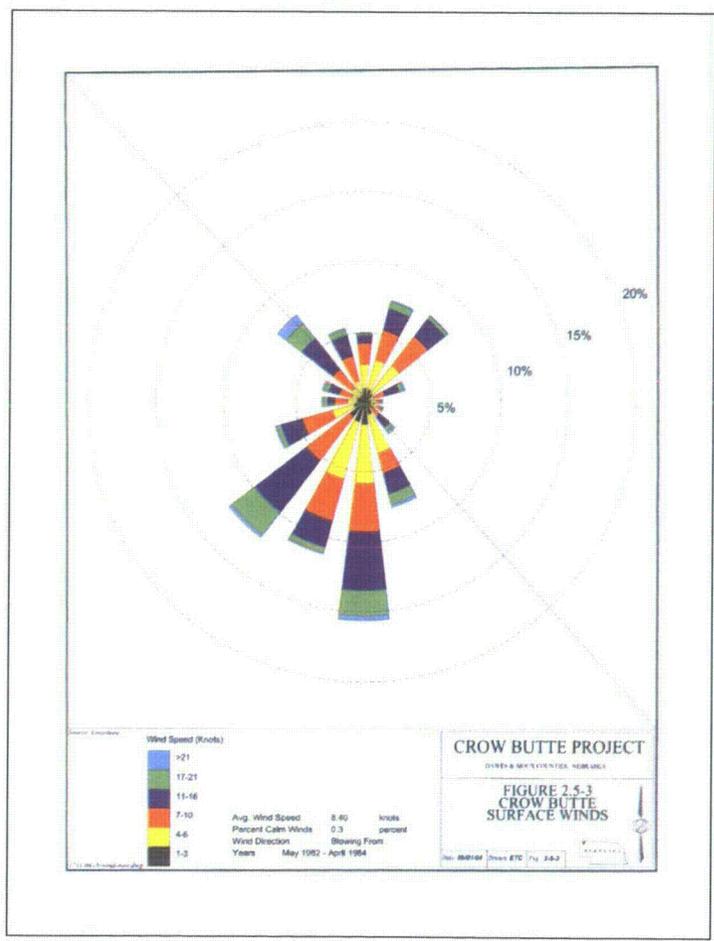
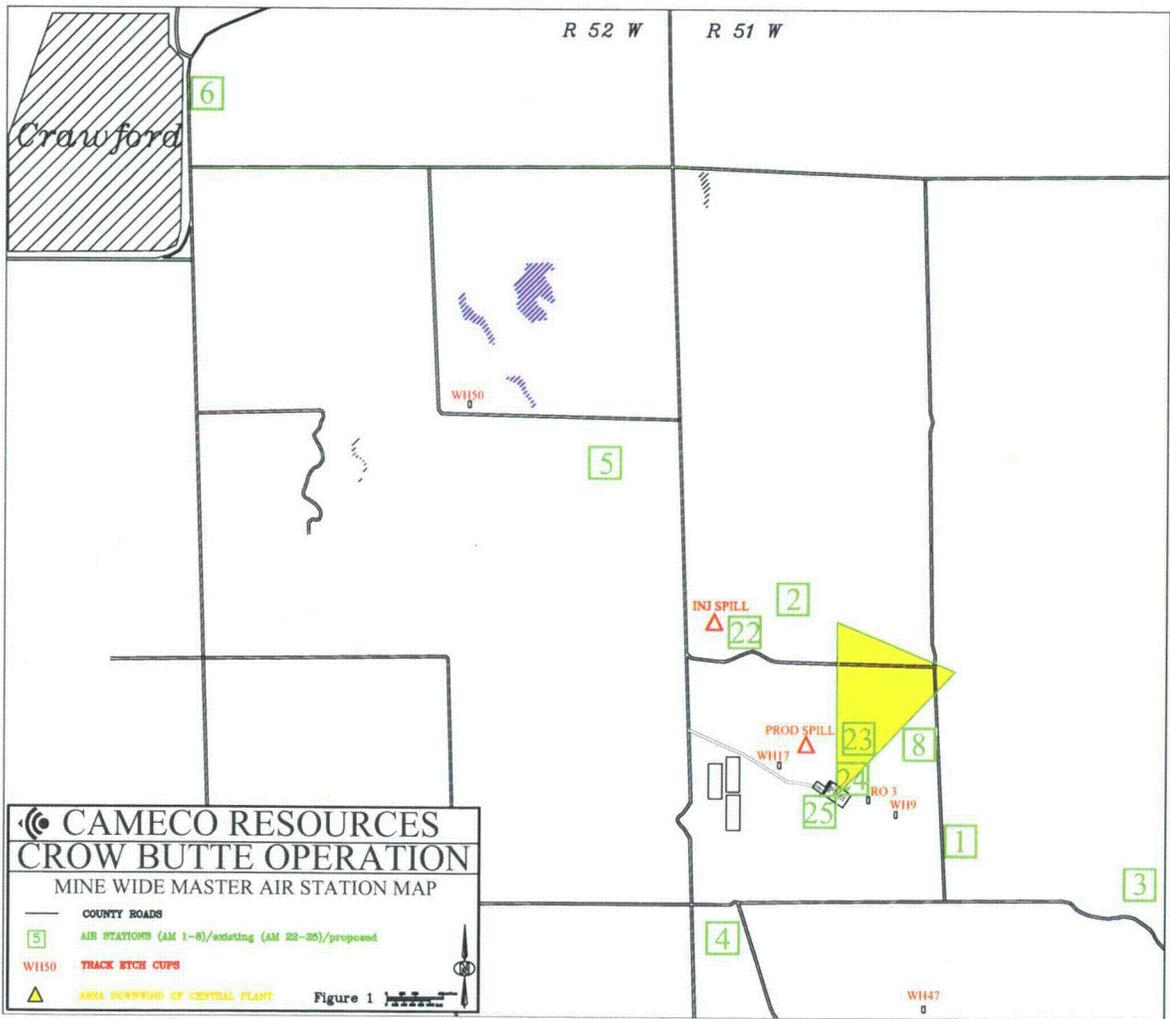
Draft Crow Butte Sampling Plan, March 15, 2011

Objective	Purpose for Data	Buildup	Decision Rule
Evaluate Dose to Public			
Vendors	Validate that dose is <100mrem/year	Particulate- AM-24, AM-25 Radon- 1-TE, 2-TE, 3-TE, 4-TE, AM-24, AM-25 Gamma- 1-TE, 2-TE, 3-TE, 4-TE, AM-24, AM-25	If dose is validated at well less than 100mrem/year, no further action. If potential exists to exceed limit, evaluate alternative assumptions and estimation methods, and/or propose monitoring.
Vendors	Demonstrate dose constraint rule (<10 mrem/yr), 10 CFR 20.1101(d)	Same as above.	If dose is validated at well less than 10mrem/year, no further action. If potential exists to exceed limit, evaluate alternative assumptions and estimation methods, and/or propose monitoring
Evaluate Occupational Dose			
Office Workers	Demonstrate adequacy of existing program by validating <10% (10 CFR 20.1502(a)(1))	Recent data collection effort for pregnant office worker will be tabulated and provided, and supported by the data collected for unbadged Lab Workers (immediately below)	If dose is well less than 10% of the allowable, no further action. If potential exists to exceed 10% of the allowable, evaluate alternative assumptions and estimation methods, and/or propose monitoring
Lab Workers (unbadged)	Demonstrate adequacy of existing program by validating <10% (10 CFR 20.1502(a)(1))	Airborne uranium- 7-A Radon daughters- 9-R, 10-R) Gamma - data from badged lab worker	If dose is well less than 10% of the allowable, no further action. If potential exists to exceed 10% of the allowable, evaluate alternative assumptions and estimation methods, and/or propose monitoring
Well field Workers (badged)	Demonstrate that current program consistently overestimates dose	Particulate – AM-2, AM-5, AM-22, AM-23 Radon- AM-2, AM-5, AM-22, AM-23 Gamma – badges Radon daughters- WH-9, WH-17, WH-47, WH-50	If the current program consistently overestimates dose, no further action. If potential exists that current monitoring/estimates may underestimate dose, evaluate alternative assumptions and estimation methods, and/or propose monitoring
Well field Construction (badged)	Demonstrate that current program consistently overestimates dose	Particulate – AM-2, AM-5, AM-16, AM-17 Radon – AM-2, AM-5, AM-16, AM-17, WH-9, WH-17, WH-47, WH-50 Gamma- badges	If the current program consistently overestimates dose, no further action. If potential exists that current monitoring/estimates may underestimate dose, evaluate alternative assumptions and estimation methods, and/or propose monitoring
$\alpha/\beta/\gamma$ implications to all workers	Demonstrate that current program consistently overestimates dose	$\alpha/\beta/\gamma$ Campaign for Dose Evaluation	If the current program adequately assesses the contribution attributable to in-growth of β -emitting isotopes, no action. If potential exists that current monitoring/estimates may underestimate contribution attributable to in-growth of β -emitting isotopes, evaluate alternative assumptions and estimation methods, and/or propose monitoring

Draft Crow Butte Sampling Plan, March 15, 2011

Objective	Purpose for Data	Buildup	Decision Rule
Evaluate $\alpha/\beta/\gamma$ Implications to Contamination Control Program			
Personal Contamination	Demonstrate that the current program adequately assesses the contribution to surface activity attributable to in-growth of short-lived β/γ emitters	$\alpha/\beta/\gamma$ Campaign for Personal Contamination	If the current program adequately assesses the contribution to dose attributable to in-growth of β -emitting isotopes, no action. If potential exists that current monitoring/estimates may underestimate contribution attributable to in-growth of β -emitting isotopes evaluate alternative assumptions and estimation methods, and/or propose monitoring.
Free Release	Demonstrate that the current program adequately assesses the contribution to surface activity attributable to in-growth of short-lived β/γ emitters	$\alpha/\beta/\gamma$ Campaign for Contamination Control	If the current program adequately assesses the contribution to surface activity attributable to in-growth of β -emitting isotopes, no action. If potential exists that current monitoring/estimates may underestimate contribution to surface activity attributable to in-growth of β -emitting isotopes evaluate alternative assumptions, correction factors and estimation methods, and/or propose monitoring.
Mixed DAC - Isotopic Analysis			
In-plant	Demonstrate applicability of <10%/30% 10 CFR Part 20. 1204(g)(2)	Particulate: 1-IST, 2-IST, 3-IST, 4-IST, 5-IST, 6-IST	If the concentrations of other uranium decay products are known and contribute well less than 10% individually, or 30% total, no action. If potential exists that other decay products could contribute 10% individually or 30% total to the dose, evaluate alternative assumptions, estimation methods, and/or monitoring.
Plant to Perimeter	" "	Particulate: AM-22, AM-23, AM-24, AM-25	If the concentrations of other uranium decay products are known and contribute well less than 10% individually or 30% total to the dose, no action. If potential exists that other decay products are near or above 10% individually or 30% total, evaluate alternative assumptions, estimation methods, and/or monitoring.
Lab	" "	Particulate: Estimated based upon results from in-plant isotopic, above.	If the concentrations of other uranium decay products are known and contribute well less than 10% individually or 30% total to the dose, no action. If potential exists that other decay products are near or above 10% individually or 30% total, evaluate alternative assumptions, estimation methods, and/or monitoring.
Perimeter	" "	Particulate: AM-1, AM-2, AM-3, AM-4, AM-5, AM-6, AM-8	If the concentrations of other uranium decay products are known and contribute well less than 10% individually or 30% total to the dose, no action. If potential exists that other decay products are near or above 10% individually or 30% total, evaluate alternative assumptions, estimation methods, and/or monitoring.

DRAFT



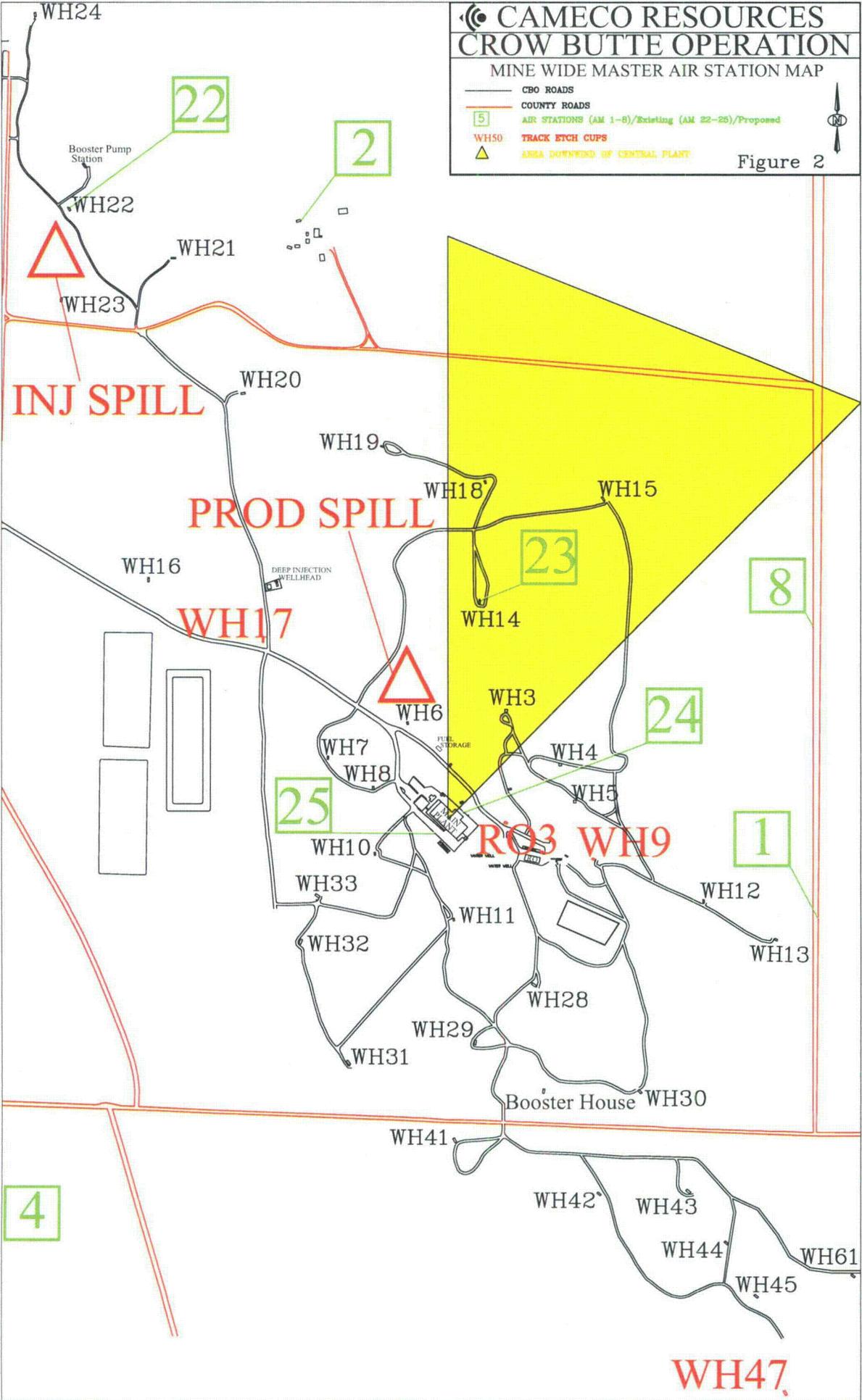
CAMECO RESOURCES
CROW BUTTE OPERATION

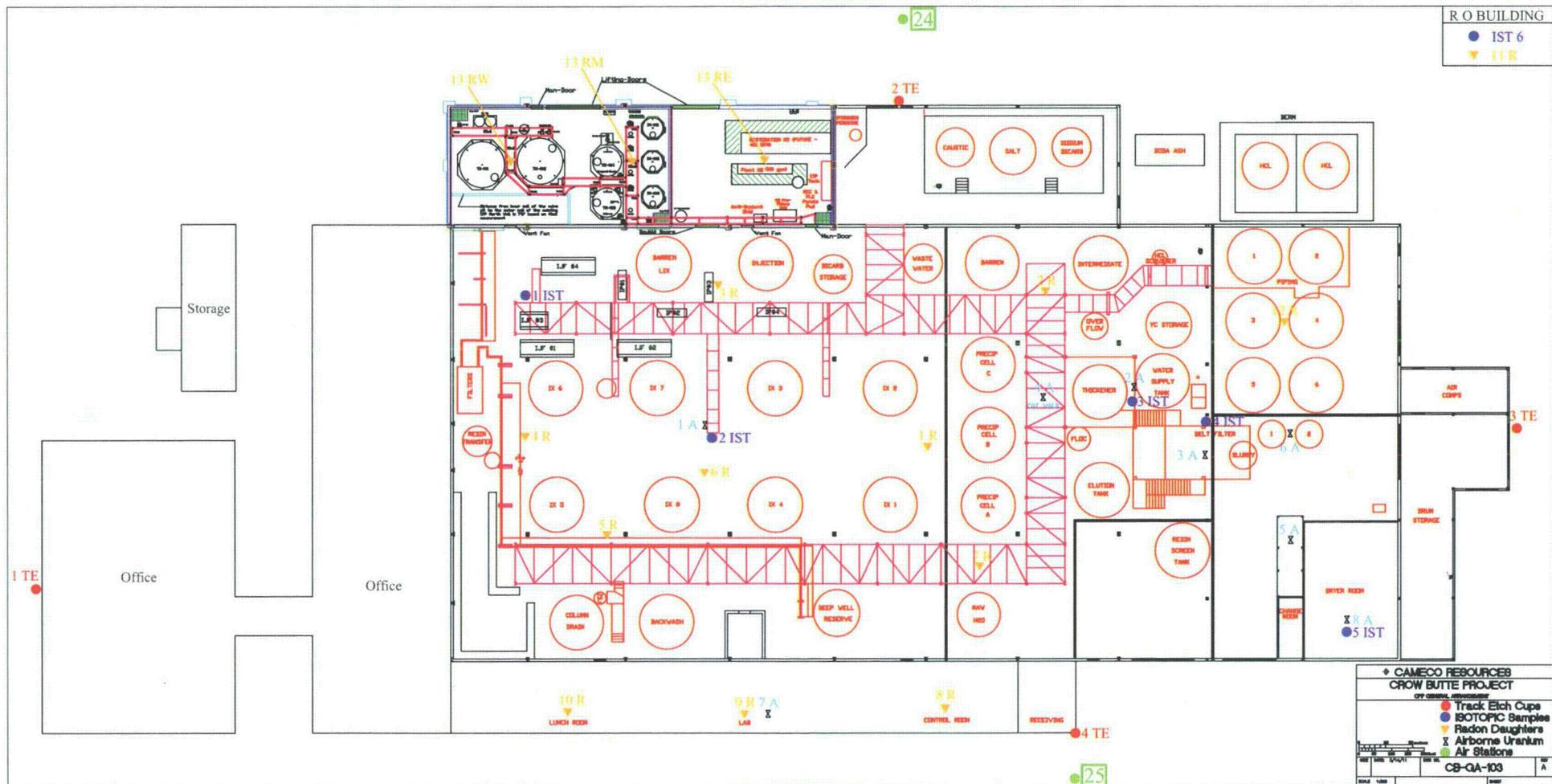
MINE WIDE MASTER AIR STATION MAP

	CBO ROADS
	COUNTY ROADS
	AIR STATIONS (AM 1-8)/Existing (AM 22-25)/Proposed
	TRACK ETCH CUPS
	AREA DOWNWIND OF CENTRAL PLANT



Figure 2





R/O BUILDING

- IST 6
- ▼ IIR

◆ CAMECO RESOURCES
 CROW BUTTE PROJECT
 CIVIL ENGINEERING

- Track Etch Cups
- Isotopic Samples
- ▼ Radon Daughters
- X Airborne Uranium
- Air Stations

CB-QA-103

Received: from mail1.nrc.gov (148.184.176.41) by TWMS01.nrc.gov
(148.184.200.145) with Microsoft SMTP Server id 8.2.247.2; Tue, 15 Mar 2011
16:22:27 -0400

X-Ironport-ID: mail1

X-SBRS: 5.3

X-MID: 33202720

X-fn: Draft Crow Butte Sampling Plan.docx, CSA AIR MONITOR STATONS-2-Model (2).pdf,
MINEWIDE-air-test-update-3-Model.pdf, PLANT-AIR-TEST-3-Model.pdf

X-IronPort-AV: E=Sophos;i="4.63,190,1299474000";

d="xml?rels?docx'72,48?scan'72,48,208,217,72,48?pdf'72,48,208,217,72,48";a="33202720"

Received: from securemail1.cameco.com (HELO cameco.com) ([207.195.96.250]) by
mail1.nrc.gov with ESMTP; 15 Mar 2011 16:22:19 -0400

Received: from ([10.0.17.122]) by securemail1.cameco.com with ESMTP with TLS
id 1SDQQN1.2586361; Tue, 15 Mar 2011 14:12:54 -0600

Received: from CA0MX02P.cameco.com ([fe80::c19c:a9f4:cd81:cbb7]) by
CA0MX03P.cameco.com ([169.254.95.120]) with mapi id 14.01.0270.001; Tue, 15
Mar 2011 14:22:14 -0600

From: John Schmuck <John_Schmuck@Cameco.com>

To: Ronald Burrows <ronald.burrows@nrc.gov>

CC: Josh Leftwich <Josh_Leftwich@Cameco.com>

Subject: Draft Crow Butte Sampling Plan

Thread-Topic: Draft Crow Butte Sampling Plan

Thread-Index: AcvjTqiRu8QYA1umRtCXtkmUnCFKmw==

Date: Tue, 15 Mar 2011 20:22:13 +0000

Message-ID:

<C9CF2A1FD2D6764E9D8E6D15CFBC5AD306506C6F@CA0MX02P.cameco.com>

Accept-Language: en-US

Content-Language: en-US

X-MS-Has-Attach: yes

X-MS-TNEF-Correlator:

x-originating-ip: [10.64.48.147]

Content-Type: multipart/mixed;

boundary="_007_C9CF2A1FD2D6764E9D8E6D15CFBC5AD306506C6FCA0MX02Pca
mecoc_"

MIME-Version: 1.0

Return-Path: prvs=1048cd8d92=john_schmuck@cameco.com