DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: **Dyno Nobel**
Facility Address: **161 Ulster Avenue, Ulster Park, NY 12487-5019**
Facility EPA ID #: **NYD000799122**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future. ____

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program

the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X	___	___	Groundwater monitoring./ Volatile Organic Contaminants(VOCs): See Table 1 Below:
Air (indoors)[2]	___	X	___	Soil gas tests have been completed. See Table 2
Surface Soil (e.g., <2 ft)	X	___	___	Soil sampling / Some VOCs, SVOCs, and metals have been detected at various areas of the plant. See Table 3.
Surface Water	X	___	___	Wetlands and the Shooting Pond are contaminated.
Sediment	X	___	___	Sediment in the Shooting Pond is contaminated See Table 4
Subsurf. Soil (e.g., >2 ft)	X	___	___	Soil sampling. / Some Metals and SVOCs. See Table 3.
Air (outdoors)	___	X	___	No Evidence of out door air contamination based on test results during RFI investigation. See Table 2

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__X__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Facility and Release Sources.

The Dyno Nobel Port Ewen Plant is located one mile south of the Village of Port Ewen in Ulster County, New York. This site is in a small valley bordered by Hussey Hill on the west and a low-lying ridge adjacent to the Hudson River to the east. To the east, northeast, and southeast of the site are wetlands that drain to several unnamed tributaries of the Plantasie Creek which flows northward into Rondout Creek which flows into the Hudson north of Port Ewen. A map of this 350 acre site is shown in Fig. 1. Only 100 of the 350 acres are developed at this time for the purpose of manufacturing explosives, primers, and igniter. (See Fig. 2a and 2b) This facility has been manufacturing these devices since 1912 when the facility was built by Brewster Explosives Company. The plant was purchased by Hercules in 1922. Hercules owned and operated the facility until 1985. IRECO, Inc. purchased the facility in June of 1985 and has been operating it until the present. In July of 1993, IRECO changed its name to Dyno Nobel, Inc. (Reference 1 and 2)

The only surface water at the plant site is located in the "Shooting Pond" Area and some of the wetlands surrounding that unit. The unit was used to destroy off-specification explosives including PETN, DDNP, HMX, PBX, RDX, lead azide, lead styphnate, detonation caps and devices, and sump powder waste. Soil and sediment contaminated with metals (primarily mercury and lead) were found in the pond sediment and in the surrounding wetlands.

The manufacturing area has been contaminated with metals and organic contaminants from the disposal of waste products in several Solid Waste management Units (SWMUs), including a Shooting Pond, four land disposal units, and a wetland area. Also, air emissions of chemicals that settled on the soil from building vents, piles of construction debris, and hazardous waste disposal operations, resulted in the formation of more than 50 small SWMUs, several of which may require corrective action.

Additional information on the SWMUs and AOCs at this facility are listed in Appendix A.

Potential Threats and Contaminants:

Contaminants.

Soil sampling has been conducted in many areas of the site, most recently as part of the completed RCRA Facility Investigation (RFI). The RFI sampling data for soils showed it to be contaminated with volatile organic constituents (VOCs) and numerous metals including mercury, selenium, copper and lead. The groundwater was shown to be contaminated primarily with VOCs and selenium, with the most heavily contaminated area of VOCs localized near the shell manufacturing building. The selenium contaminated groundwater is located at the northeast corner of the plant. Indoor air quality does not seem to have been negatively affected by contaminated groundwater or soil at the site.

Potential Threats From Contaminated Groundwater.

Groundwater flow in the overburden is toward the northeast and the discharge area represented by the wetlands. Groundwater movement within the shallow overburden (silt and clay) is predominantly vertical, while flow in the deep overburden (sand and gravel) is predominantly horizontal. Groundwater flow in the bedrock occurs within a highly fractured upper zone, which behaves as one hydro stratigraphic unit with the overlying sand and gravel deposits.

The overburden at the site consists of silt and clay deposits underlain by a sand and gravel layer. The upper 15 feet of the silt and clay can generally be described as a moist, brown silty clay, trace of sand. This then grades to a wet gray silty clay to clay, trace of sand. The gray silty clay layer ranges in thickness from 3.5 feet to 66.8 feet. Underlying the silty clay is a sand and gravel layer ranging from 3.5 feet below ground surface (bgs) to 66.8 feet bgs. Within the Shell Plant Area, the brown silty clay is present from ground surface to approximately 15 to 18 feet. This is underlain by the gray silty clay to clay to approximately 44 to 49 feet bgs, sand and gravel to approximately 54 to 60 feet bgs, and bedrock.

There are two plumes of contaminated groundwater at the facility (See Table 1 and Table 1.1). These two contaminated groundwater plumes show significant contamination in excess of New York State Part 703 Groundwater Standards and are currently under additional investigation. In the northern portion of the facility is a plume containing selenium and in the Shell plant area is a plume of volatile organic contaminants. Additional wells have been installed (August 2002) downgradiant of the known plumes to further delineate them and ascertain the degree to which natural attenuation may be playing a role in remediation of the plumes. Natural attenuation means that factors such as distance from the plume to the property line, the ability of the clay in the overburden to absorb contamination and the effects of wetlands on contaminants reduces the concentration of contaminants that would otherwise flow beyond the facility property. Further information based on sampling of these plumes will be available in December 2002.

Groundwater is not used as a source of drinking water on site; bottled water is available in each building. However, groundwater obtained from an upgradiant well about 1000 feet southwest of the Shell Plant Building plume, is used for showers, sinks and sanitation. According to communications from the Environmental Manager at Dyno Nobel, this groundwater source is tested each month for chlorinated compounds and Coliform, and at least once a year for lead and other VOCs. The most recent data from these tests show no detection of organics in the well water and only trace amounts of lead and copper at the tap (Reference 3 - May 5, 2002 and January 10, 2002). The groundwater well used for this purpose is located upgradiant from the area of contaminated groundwater.

Trespassers are discouraged from entering the site by a combination of fencing and security personnel, and they would not be expected to come in contact with contaminated groundwater. Workers sampling and managing contaminated groundwater are required to follow appropriate health and safety procedures.

TABLE 1
Highest levels of Organic Contaminants found in the facility's Groundwater

Adjacent to the Shell Plant Building vs. Groundwater Standards

Compound	Facility Groundwater (ug/l)	Groundwater Standard (ug/l)
Acetone	10,000,000	50.0
Benzene	10	0.7
2-Butanone	5300	50.0
chloroform	500	7.0
Carbon Tetrachloride	28000	5.0
1,1-Dichloroethane	500	5.0
1,1-Dichloroethene	2600	5.0
1,2 -Dichloroethane	500	5.0
1,2 -Dichloroethene	500	5.0
Methylene chloride	4000	5.0
Trichloroethene	11,000,000	5.0
Tetrachloroethene	5,000,000	5.0
1,1,1-Trichloroethane	21,000	5.0
1,1,2-Trichloroethane	500	5.0
1,1,2,2-Tetrachloroethane	500	5.0
bis(2-Ethylexyl)phtalate	260	50.0

TABLE 1.1
Highest levels of Inorganic Contaminants found in the Facility's Groundwater.

Compound	Facility Groundwater (ug/l)	Groundwater Standard (ug/l)
Aluminum	12000	NA
Antimony	ND	3
Arsenic	100	25

Barium	1500	1000
Cadmium	43	5
Chromium	300	50
Cobalt	140	NA
Copper	470	200
Lead	140	15
Mercury	0.72	0.7
Selenium	398	10

Potential Threats From Air Contamination (Indoor).

Background on the Shell Plant Area:

Trichloroethylene (TCE) has been detected in overburden groundwater samples in the Shell Plant Area. The RCRA Facility Assessment (RFA) identified three solid waste management units (SWMUs) in the vicinity of the Shell Plant, as potential sources of the TCE: SWMU 24 – Former Wastewater Treatment Facility, SWMU 30 – Drainage Ditch (downgradiant of Building 2036), and SWMU 37 – Former Shell Plant Drum Storage Area.

The groundwater investigation portion of the RCRA Facility Investigation (RFI) included a HydroPunch® investigation in the Shell Plant Area to estimate the vertical and horizontal extent of impacts to groundwater quality, and to aid in the placement and evaluation of future monitoring wells. TCE was detected at elevated concentrations in the silt and clay to 20 feet bgs East of the Shell Plant. The TCE concentration in the deeper sample (37 to 37.5 feet) was 46,000 ug/l, which is greater than one percent of its solubility limit. USEPA guidance suggests that a DNAPL source may be present in such instances.

Additional investigation was conducted, which included installation and sampling of three well couplets to assess whether TCE has migrated to the sand and gravel and bedrock water-bearing zones underlying the Silt and Clay. Volatile organic compounds (including TCE) were not detected in any of the samples.

The Shell Plant area was the only building that could possibly be contaminated by VOCs (primarily TCE) contained in a groundwater plume under the building. The soil gas under this building was investigated in August of 2002 and no contaminants at levels of concern were detected. A background air sample was collected about 20 feet north of the Shell Plant and no contaminants at levels of concern were detected in the ambient air. See Table 2.

TABLE 2

Highest Levels of contaminants found in the soil gas under the Shell Plant Building vs. the Target Screening Level for Indoor Air (ppbv)

Compound	Shell Plant Soil Gas (ppbv)	Indoor Air Target Screening Level (ppbv)
chloroform	7.6	8.9
cis-1,2-Dichloroethene	6.8	880
dichlorodifluoromethane	0.72	n/a
Methylene chloride	46	610
Tetrachloroethene	1.7	250
Toluene	0.91	11,000
Trichloroethene	35	110
1,2,4-trimethylbenzene	0.77	n/a
xylene (m,p)	0.86	160,000

Potential Threats From Contaminated Soil (Surface and Subsurface).

Areas of soil throughout the site are contaminated with lead and mercury. See Table of Groups 1 and 2 in Appendix "A" for a list of the sites. Most of the contamination is surficial with notable exceptions near the Shooting Pond, SWMUs 50 and 51, and the Landfills, where contamination extends down to 8 feet below grade. See Tables 3 and 3.1.

Due to the possibility of serious explosions or accidents occurring at this facility, caution and care are critical at the site. In 1996 Dyno hired UXB Corp. to remove "reactive" soils and contaminants from several areas at the site after 2 people died in an accident involving explosives. A total of 17 SWMUs most likely to have shock sensitive explosives were screened by UXB; 6 units were found to need some form of remediation. Approximately twenty-one 55 gallon drums of soil contaminated with explosive material was removed from these 6 units. This material was primarily found in surface soils due to particulate deposition of explosive powders. UXB excavated and disposed of soil at these units until no further explosive material was left in the soil. For some units this process also removed all soil contaminated with hazardous waste or hazardous constituents. Although these past cleanup activities have reduced the threat of explosions, not all contaminated areas have been remediated. The potential threat of such explosions from chemicals imbedded in the soil still exists for workers. Since the site is secure, trespassers would not be expected to come in contact with contaminated soils. Any construction (corrective measures) to be implemented on site would be in accordance with an appropriate health and safety plan. All personnel are required to walk only on paved walkways, and contractors are required to take a 3 hour class on safety at the Dyno facility.

The safety of people at this site is significantly dependant upon strict compliance and enforcement of the rules provided to all workers and visitors. (References 4, 5, and 6).

TABLE 3
Highest Levels of In-Organic Contaminants Found in the Facility's Soil.
vs. Recommended Soil Cleanup Levels

Compound	ppm	Recommended Soil Cleanup Levels (ppm)
Antimony	99	SB*
Arsenic	130	3-12 or SB
Barium	2400	15-600 or SB
Cadmium	18	1 or SB
Chromium	150	1.5-40 or SB
Cobalt	130	2.5-60 or SB
Copper	100000	1-50 or SB
Lead	27000	400 or SB
Mercury	1500	.2 or SB
Selenium	1000	.1- 3.9 or SB

* Site Background

TABLE 3.1
Highest Levels of SVOC Contaminants Found in the Facility's Soil.

Compound	ppm	Recommended Soil Cleanup Levels (ppm)
Benzo (a) Anthracene	1500	0.9
Benzo (b) Fluorathene	2200	0.9
Benzo (k) Fluorathene	1000	9.0
Benzo (a) Pyrene	1600	0.09
Chrysene	91	88.0
Naphthalene	170	13.0

Anthracene	480	50.0
Benzo (g, h, i) perylene	1000	50.0
Bis(2-ethylhexyl) phthalate	350	50.0
Pyrene	2100	50.0
2-Methyl naphthalene	260	36.4
Phenanthrene	160	50.0

Potential Threats From Surface Water.

The only surface water at the plant site is located in the "Shooting Pond" Area and some of the wetlands surrounding that unit. The unit was used to destroy off-specification explosives including PETN, DDNP, HMX, PBX, RDX, lead azide, lead styphnate, detonation caps and devices, and sump powder waste. Soil and sediment contaminated with metals (primarily mercury and lead) were found in the pond sediment and in the surrounding wetlands.

The surface water exiting the facility property has been tested (October 2001, August 2000) and found not to be contaminated (Reference 7). The contaminated sediments are within a fenced-in area of the property. The manufacturing area is also surrounded by a fence, and the fence is surrounded by Dyno's private property (with "no trespassing" signs). In addition, the terrain is generally very difficult to walk though, so it is unlikely that people will be able to come in contact with surface water at the Shooting Pond and adjacent wetland area.

Potential Threats From Sediment.

Contaminated Sediment exists beneath the Shooting Pond and parts of the wetland surrounding the Shooting Pond (SWMUs 1 and 22). The primary contaminants are lead and mercury. This area is kept off limits to trespassers by a fence, and the surrounding private property (with "no trespassing" signs). The terrain is generally very difficult to walk though, making it unlikely that people will come in contact with sediments in the contaminated area. See Table 4.

TABLE 4
Highest levels of Metals found in Sediment/wetland areas

Compound	ppm	Recommended Soil Cleanup levels ppm
Barium	4000	15-600 or SB
Chromium	250	1.5-40 or SB
Copper	9200	1-50 or SB

Lead	11000	400 or SB
Mercury	160	.2 or SB
Selenium	2200	.1- 3.9 or SB

*Site Background

Potential Threats From Air Contamination (Outdoor).

In August 2002 when soil gas samples were collected from under the Shell Plant building, a background sample of air was collected from 20 yards outside of the Shell Plant building. No contaminants were discovered.

Cleanup Approach and Progress:

The 6NYCRR Part 373 permit requires the submission of an RCRA Corrective Measures Study (CMS) to evaluate potential remedies for the contaminated groundwater, the waste and soil in the Shooting Pond and the waste material in the two land disposal units. The permit also requires a focused CMS and interim corrective measure (ICM) removal action design plan for the approximately 25 SWMUs and 4 AOCs located within the manufacturing area, as well as for any SWMUs which may be identified in the future. The Draft CMS was submitted in December of 2000 to DEC, but has not yet been finalized.

In addition to the 1996 work performed by UXB, other Interim Corrective Measures have included the removal of explosive materials from a sump of Building 2075, and construction of a large chain-link fence immediately east of the main manufacturing area surrounding the Shooting Pond, Stone Fence Dump and the contaminated wetland areas.

References:

1. Corrective Measure Study (CMS) Dyno Port Ewen Plant, Volume I - December 2000

2. RCRA Facility Investigation (RFI) Report, Dyno Port Ewen Plant, - December 1999

3. VOC, Lead and Copper Analysis from Dyno Nobel's onsite production well dated May 5, 2002 and January 10, 2002.

4. Dyno Nobel Safety Rules and Instructions Handbook #HD-6-009425. Rule #3.10 states that "Employees must not enter or go near Buildings other than those necessary for the performance of their duties" Rule #3.23 states that "Personnel are to remain on designated walkways if available and shall not cut across the grass."

5. Documentation of Interim Corrective Measures (ICM) for Explosives - Dyno Nobel Facility Port Ewen, New York. Prepared by UXB International - January 1997

6. Dyno Nobel - Port Ewen Plant Safety information sheet. QA#1185. All visitors to the plant must read and sign a copy of this sheet of basic safety procedures. Rules include # 11 "do not walk or drive around the plant unescorted" and # 13 "Do not leave main roads, and adhere to all road signs."

7. "Exceedences in Groundwater and Surface Water" October 2001 - Dyno Nobel; and "Semi-annual Groundwater Sampling" (August), November 15, 2000

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Site Responsibility and Legal Instrument:

A New York State Order on Consent executed on April 15, 1996 addresses the implementation of RCRA corrective action investigations. Specifically, many Units were investigated and determined that either some additional work was needed or no further action was needed. Once the investigations were completed, the Order was superceded by a Hazardous Waste Permit. The 6NYCRR Part 373 Hazardous Waste Management Permit for the facility addresses: (1) the storage and management of hazardous waste in containers; (2) the destruction of hazardous waste in an RCRA Subpart X detonation unit; and (3) RCRA corrective action, which includes: corrective measures study(s), interim corrective measures design (ICM) submissions and groundwater monitoring and reporting.

Permit Status:

A New York State 6NYCRR Part 373 Hazardous Waste Management Permit was issued on September 22, 2000, and will expire on September 22, 2005.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	NO	NO	NO	NO	NO	NO	NO
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft)	NO	NO	NO	NO	NO	NO	NO
~~Surface Water~~							
Sediment	NO	NO	NO	NO	NO	NO	NO
Soil (subsurface e.g., >2 ft)	NO	NO	NO	NO	NO	NO	NO
~~Air (outdoors)~~							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

__X__ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Groundwater.

Groundwater is not used as a source of drinking water on site; bottled water is available in each building. However, groundwater obtained from an upgradient well about 1000 feet southwest of the Shell Plant Building plume, is used for showers, sinks and sanitation. According to communications from the Environmental Manager at Dyno Nobel, this groundwater source is tested each month for chlorinated compounds and coliform, and at least once a year for lead and other VOCs. The most recent data from these tests show no detection of organics in the well

water and only trace amounts of lead and copper at the tap. (Reference 3 - May 5, 2002 and January 10, 2002).

Homes located downgradient from the plant are on public water and do not use groundwater. The nearest homes to Dyno are approximately 1/4 mile from the fenced-in manufacturing area on the opposite side of the wetlands. Groundwater from the facility discharges to the wetlands where through natural processes the contamination is remediated. It is unlikely that contaminated groundwater will reach any neighboring residences. Additional monitoring wells have recently been placed downgradient of the known plumes to further delineate their boundaries.

Air (indoor and outdoor)

The Shell Plant is the only building that could possibly be contaminated by VOCs (primarily TCE) contained in a groundwater plume under the building. The soil gas under this building was investigated in August of 2002 and no contaminants at levels of concern were detected. A background air sample was collected about 20 feet north of the Shell Plant and no contaminants at levels of concern were detected in the ambient air.

Soil (Surface and Subsurface)

Workers and visitors are provided Health and Safety information and training which minimizes or eliminates exposure to soil.

The nearest homes are approximately 1/4 mile away from any contaminated soil. Trespassers are prevented from accessing these soils by security fencing surrounding all contaminated soil areas of the site.

Surface Water

The surface water exiting the facility property has been tested (August 2000 and October 2001) and found not to be contaminated (Reference 7). It is unlikely that people will be able to come in direct contact with surface water at the site.

Sediment

Contaminated Sediment exists beneath the Shooting Pond and parts of the wetland surrounding the Shooting Pond (SWMUs 1 and 22). The primary contaminants are lead and mercury. This area is kept off limits to trespassers by a fence, and the surrounding private property (with "no trespassing" signs). The terrain is generally difficult to walk though, making it unlikely that people will come in contact with sediments in the contaminated area.

Sewers

There are no known direct discharges of wastewater to surface or groundwater at this site. There are no industrial sewers at this facility. However, several processes do discharge some wastewater to the sanitary sewer system. These waste waters are sent to a POTW (licence number WPD-01-0008). Two storm sewers at Dyno first discharge to the sanitary sewer system on-site and are then sent to the POTW along with the facilities other waste waters.

Footnotes:

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Footnotes:

4 If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Dyno Nobel facility, EPA ID # NYD000799122, located at 161 Ulster Avenue, Ulster Park, NY 12487-5019 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by:_____ Date: September 30, 2002

_____Paul Patel, P.E.
Environmental Engineer 2
New York State Department of Environmental Conservation (NYSDEC)

Supervisor: _____ Date: September 30, 2002

Roger Murphy P.E.
Acting Chief, Eastern Corrective Action Section

NYSDEC

Supervisor: _____ Date: September 30, 2002

Edwin Dassatti P.E.
Director, Bureau of Solid Waste & Correction Action
NYSDEC

Locations where References may be found:

NYSDEC
Division of Solid and Hazardous Materials
625 Broadway - 8th Floor
Albany, NY 12233-7252

Contact telephone and e-mail numbers

Paul Patel (518) 402-8594 E-Mail: appatel@gw.dec.state.ny.us

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Appendix A

Facility SWMUs and AOCs:

There is currently a total of 60 SWMUs and 9 AOCs at this facility. Of the SWMUs, 59 have been investigated, and three recently discovered SWMU/AOCs are currently being investigated. Of the SWMUs that have been studied, 41 of them have been found to contain contaminants that could pose a threat to human health or the environment if suitable controls are not implemented. One recently discovered SWMU is still being investigated.

Of the 9 AOCs, 5 of them have been found to contain contaminants that could pose a threat to human health or the environment if suitable controls are not implemented. Two of the AOCs are still being investigated.

The single inaccessible SWMU will be remediated after it is no longer in use.

Although the contaminated/non contaminated status of the units is known, some units may need further characterization with regard to the reactivity of the soil, or unexploded ordinances disposed of in the soil. This information is needed to ensure that the personnel implementing the Corrective Measures will be safe.

The combined total of 69 units can be divided into 7 Group Types:

Group 1 - Heavy Metal Surface Deposition - Soil

No.	Unit Description	Type	Next Step
2	Burning Cage/Incinerator	SWMU	CMS
3	Copper Wire Burning Area	SWMU	CMS
4	Iron Wire Burning Area	SWMU	CMS
5	Wire Burning Area III	SWMU	CMS
6	Open Burning Pads	SWMU	CMS
7	Open Burning Pads	SWMU	CMS
8	Former Burning Area	SWMU	CMS
9	Waste Powder Catch Basins - Building 2037	SWMU	CMS
10	Waste Powder Catch Basins - Building 2048	SWMU	CMS
11	Waste Powder Catch Basins - Building 2049	SWMU	CMS
13	Former Waste Powder Catch Basins - Lead Azide Building	SWMU	CMS
21	Lead Recycling Unit Area	SWMU	CMS
26D	Burnable Waste Satellite Accumulation Areas	SWMU	CMS
26E	Burnable Waste Satellite Accumulation Areas	SWMU	CMS
26G	Burnable Waste Satellite Accumulation Areas	SWMU	CMS
27	Sanitary Sewer System	SWMU	CMS
29	Drainage Ditch (Downgradiant of Building 2049)	SWMU	CMS
33	Mercury Fulminate Tanks Area	SWMU	CMS
39	Former Wastewater Discharge Area	SWMU	CMS
40	Pilot Line Condensate Collection Sump	SWMU	CMS

No.	Unit Description	Type	Next Step
42	SAC Building Steam Collection Containers	SWMU	CMS
46	Vacuum Line Condensate Collection Sump - Building 2059 (need conformation samples)	SWMU	CMS
47	Building 2058 Fuse Room	AOC	CMS
49	Building 2073 Sump	SWMU	CMS
51	SWMU 51 (Surface)	SWMU	CMS
52	SWMU 52 (Deep)	SWMU	CMS
A	Kerosene Tank Leak	AOC	CMS
B	Open Burning Pads Area	AOC	CMS
C	Open Detonation Pit	AOC	CMS
D	Detonation Test Building	AOC	CMS

Group 2 - Landfills

No.	Unit Description	Type	Next Step
22	Former Landfill	SWMU	CMS
23	Former Dump	SWMU	CMS
32	Old Dump (near water tower)	SWMU	CMS
35	Stone Fence Dump	SWMU	CMS
48	Mercury Fulminate Area	SWMU	CMS

Group 3 - Surface Water

No.	Unit Description	Type	Next Step
1	Shooting Pond (and surrounding wetlands)	SWMU	CMS

Group 4 - Wetlands

No.	Unit Description	Type	Next Step
22	Former Landfill	SWMU	CMS

Group 5 - Groundwater

No.	Unit Description	Type	Next Step
24	Former Wastewater Treatment Facility	SWMU	CMS
30	Drainage Ditch (Downgrade of Building 2036)	SWMU	CMS
37	Former Shell Plant Drum Storage Area	SWMU	CMS

Group 6 - RFA/RFI investigation

No.	Unit Description	Type	Next Step
53	Package Burn Test Area	SWMU	RFI
G	Former Drying House	AOC	RFA/RFI
H	Former Drying House	AOC	RFA/RFI

Group 7 - No Further Action(NFA)/Inaccessible

No.	Unit Description	Type	Next Step
12	Waste Powder Catch Basins - Charge and Press Building	SWMU	Inaccessible
14	Waste Powder Magazine - Building 9222	SWMU	NFA
15	Waste Powder Magazine - Building 9216	SWMU	NFA
16	Waste Powder Magazine - Building 3002	SWMU	NFA
17	Former Waste Storage Trailer	SWMU	NFA
18	Former Waste Degreaser Storage Building Area	SWMU	NFA

No.	Unit Description	Type	Next Step
19	New Waste Degreaser Storage Building Area	SWMU	NFA
20	Former Empty Drum Storage Area	SWMU	NFA
25	New Wastewater Treatment Facility	SWMU	NFA
26A	Burnable Waste Satellite Accumulation Areas	SWMU	NFA
26B	Burnable Waste Satellite Accumulation Areas	SWMU	NFA
26C	Burnable Waste Satellite Accumulation Areas	SWMU	NFA
26F	Burnable Waste Satellite Accumulation Areas	SWMU	NFA
28	Scrap Metal Area	SWMU	NFA
31	Old Well House	SWMU	NFA
34	Old Waste Burning Grounds (near Shooting Pond)	SWMU	NFA
36	Pellet House Septic Tank	SWMU	NFA
38	Grenade Disposal Area	SWMU	NFA
41	Detonator Production Building Condensate Collection Sump	SWMU	NFA
43	Lab Annex Condensate Collection Sump	SWMU	NFA
44	Lead Azide Building Washwater Settling Tank (formally SWMU 13)	SWMU	NFA
45	Washwater Collection Tanks - Building 2009	SWMU	NFA
50	Building 2075 Sump	SWMU	NFA
E	Former Building 2073	AOC	NFA
F	Building 2075	AOC	NFA

Note: Inaccessible SWMUs will be remediated after the unit is no longer in use. These determinations are based on information provided in the RCRA Facility Investigation Report approved by the Department on July 11, 2000, on

the no further action (NFA) decisions made by the Department on May 2, 1997 and December 15, 1999, and various site visits by Department Personnel.